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ABSTRACT

A pre--Post secondary curriculum for preparing eleventh and twelfth grade students contemplating postsecondary education in the health occupations is presented in the document. The curriculum would assist high school students in their choice of health careers and in entering postsecondary education smoothly. The pre--post secondary curriculum includes academic and observational programs. The academic program (four days of the week) focuses on five areas: life science (core subject), physical science, mathematics, communications, and social studies/humanities. The observational program (one day per week) is comprised of activities such as survey and intensive excursions, visits by health professionals to the instructional center, audiovisual materials center, and visits to schools of higher education. A scheduling system for both programs and staff requirements for their implementation are discussed. The major portion of the document (360 pages) presents the details of the curriculum. First and second year content outlines and first and second year weekly curricula are presented separately for the following areas: (1) mathematics, (2) field experience--first and second year field activities, (3) life science, and (4) physical science. A list of film suppliers and suggested textbooks and laboratory manuals are included. (EC)

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PRE-POST SECONDARY CURRICULUM PROGRAM

Curriculum Guide

HEALTH

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Prepared

by

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for

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TABLE OF CONTENTS

Preface 1

Statement of Problem 2

Philosophy of Program 3

Objectives of the Program 10

The Curriculum
  1. Program Rationale 12
  2. Acedemic Program 12
  3. Observational Program 15

Program Scheduling 18

Program Staffing 19

Mathematics 20
  1. Overview Statement 20
  2. 1st Year Content Outline 21
  3. 2nd Year Content Outline 26
  4. 1st Year Curriculum (weekly) 31
  5. 2nd Year Curriculum (weekly) 69
  6. Mathematics Bibliography 106

Field Experience 109
  1. Overview Statement 109
  2. 1st Year Field Activities 110
  3. 2nd Year Field Activities 169

Life Science 222
  1. 1st Year Content Outline 222
  2. 2nd Year Content Outline 227
  3. 1st Year Curriculum (weekly) 231
  4. 2nd Year Curriculum (weekly) 264

Physical Science 297
  1. 1st Year Content Outline 297
  2. 2nd Year Content Outline 302
  3. 1st Year Curriculum (weekly) 307
  4. 2nd Year Curriculum (weekly) 343

Film Suppliers 381

Textbook and Lab Mannuals 382
  1. 1st Year Life Science 382
  2. 2nd Year Life Science 383
  3. 1st Year Physical Science 387
  4. 2nd Year Physical Science 388

PREFACE

Great and significant efforts have been made to provide relevant education for students who are considered to be in the lower portions of their high school classes. A clear cut example can be found in the existance and the efforts of the joint vocational school districts throughout the state of Ohio, not to mention, the many vocational schools that can be found in the metropolitan areas. On the other hand, little effort has been made, if in fact none at all, to provide relevant education for students who are at the top of their classes. Granted, most schools are providing accelerated programs where students can get course work in advanced biology, advanced mathematics, advanced chemistry, and so on. But, is this really a significant effort in relevancy?

The Pre-Post Secondary Program makes the assumption that many gifted students have occupational asperations in mind that involves work in an institution of higher learning. But, usually these people are denied any exposure to that occupation until in many cases they have completed four or eight years of college work. An exception exists at the Medical College of Ohio. Here students who have been admitted and are studying to become physicians spend several days out of the year with practicing physicians in the Toledo area. The exposure provides insight into the life style of the professional. But the question arises as to why the student must be deprived of gaining this experience until he enters a professional school after four years of university work.

In the discussion and brainstorming sessions that were held early in the summer of 1973, the Pre-Post Secondary Health Committee decided with the support of the health community that students in high school who do have definite occupational asperations should be given some type of experience to either support or convince them that those asperations are or are not for them. It is upon this premise that the curriculum was conceived and written.

At this point, attention is directed to those people who have spent a great deal of time in developing this curriculum. They were: Louise Loomis, a nursing instructor at Owens Technical College; Karen Swartz, an instructor of health in the Rossford Public School system; Mr. Robert Troyer, a physics and mathematics instructor at the Owens Technical College; Mr. Won S. Ryu, an instructor of biological sciences at Maumee High School; Dr. William Potvin, an assistant professor of basic engineering at Owens Technical College; Mr. David Miller, an instructor of communications at Owens Technical College; and Mrs. Irene Sagert, Chairman of the English Department at Swanton High School. The efforts of Dr. Byrl Shoemaker, Director of Vocational Education for the State Department of Education in Columbus and Dr. Jacob H. See, President of the Michael J. Owens Technical College for their ideas in conceiving the project must be acknowledged. Appreciation is also expressed to Paula Schroeder and Regina Wojton, secretarial students at Owens College who typed the manuscript.

Michael P. Roetter
Boyd P. McClaskey
Project Directors

STATEMENT OF PROBLEM

One of the Seven Cardinal Principles of Education identified by 1918-Commission on Secondary Education of the National Education Association was the Preparation for Economic Efficiency. Career education has again brought this into the foreground of education. A much broader concept and meaning has been placed upon this principle with the advent of our technological age. Today the preparation of youth for work must have greater resources and a much more diversified curriculum.

Highly correlated with resources and diversity of curriculum is the size of the school district and student enrollment. If a school district has a small tax base and a small enrollment they are limited in curriculum offerings unless they operate at excessive cost. This becomes more acute in the smaller schools as students reach grades 11 and 12.

However, with the advent of education for all pupils it has become necessary to take such measures as school district consolidation or the forming of joint vocational school districts. The latter is proving very satisfactory in providing a vocational education curriculum with a satisfactory breadth of vocational offerings. This same jointure holds promise for a diversified pre-postsecondary curriculum.

Just as one vocational education program could not satisfactorily prepare all students for a diversity of vocations, it is becoming obvious that the college preparatory program cannot satisfactorily prepare all students for a variety of postsecondary occupational programs. A need exists to offer student in grades 11 and 12 a diversity of pre-postsecondary educational programs.

Some member schools of joint vocational school districts are not able to offer the college preparatory program for their students. If no college preparatory programs are offered, the postsecondary bound students in some cases find themselves attending high school for a minimal number of hours each day during grades 11 and 12. The students abilities and talents are not challenged or developed by experience in a classroom or laboratory to further investigate and experience activities in a pre-postsecondary area of their choice.

STATEMENT OF PROBLEM (con't)

Many of the joint vocational school districts in Ohio have health occupational as well as other laboratories with modern equipment. At the present time students in the local high schools desiring pre-postsecondary programs do not have access to the laboratories. It is felt that the development of a variety of pre-postsecondary programs in the joint vocational school districts which would include those subjects required for high school graduation and postsecondary institution entrance would enhance the career education training for these postsecondary bound students and solve the problem.

PHILOSOPHY

The structure of society is rapidly changing from an industrial base to that of a service base. A prodigious part of that service industry is represented by persons involved in health occupations. It is the philosophy of the pre-postsecondary curriculum in health occupations project that during the junior and senior years in high school, students who anticipate entering one of the health professions need a full complement of courses that prepare students academically for entrance and provide orientation into programs in post-seconday education in health careers.

The occupational areas of interest in the Pre-Post Secondary Curriculum Project are those which require work leading to a degree in an institution of higher education. The program could range from Associate Degree Programs in two-year colleges to Doctorates from schools of Medicine. The areas considered and their respective job analysis (from Occupational Outlook Handbook) follow:

REGISTERED NURSES

Nursing care plays a major role in the treatment of persons who are ill. Registered nurses, in carrying out the medical treatment plan prescribed by physicians, administer medications and treatments; observe, evaluate, and record symptoms, reactions, and progress of patients; assist in the education and rehabilitation of patients; help maintain a physical and emotional environment that promotes patient recovery; instruct auxiliary personnel or students; and perform other duties concerned with the care of the sick and injured, prevention of illness, and promotion of good health. Nurses also engage in other activities such as research and serving on the staffs of nursing and community organizations.

Hospital nurses are the largest group of registered nurses. Most are staff nurses, who perform skilled bedside nursing such as caring for a patient after an operation, assisting with blood transfusions and intravenous feedings, and giving medications. They also supervise auxiliary nursing workers. Hospital nurses usually work in a specialty area such as operating room, recovery room, intensive care unit, coronary care unit, emergency room, medical-surgical ward, obstetrics, or orthopedics. Others limit their work to nursing children, the elderly, or the mentally-ill. Still others are engaged primarily in administrative work.

Private duty nurses give individual nursing care to patients needing constant attention. In hospitals, one private duty nurse may sometimes take care of several patients who require special nursing care but not full-time attention.

Office nurses assist physicians, dental surgeons, and occasionally dentists in the care of patients in private practice or clinics. Sometimes, they perform routine laboratory and office work.

Public health nurses care for patients in clinics or visit them in their homes. Their duties include instructing patients and families, and giving periodic nursing care as prescribed by a physician. They instruct groups of patients in proper diet and arrange for immunizations. These nurses work with community leaders, teachers, parents, and physicians in community health education programs. Some public health nurses work in schools.

Occupational health or industrial nurses provide nursing care to employees in industry and government, and along with physicians are responsibile for promoting employee health. As prescribed by a doctor, they treat minor injuries and illnesses occurring at the place of employment, provide for the needed nursing care, arrange for further medical care if necessary, and offer health counseling. They also may assist with health examinations and inoculations to help prevent or control diseases.

DENTAL HYGIENISTS

Dental hygienists work under the supervision of a dentist; they clean teeth by removing stains and calcium deposits, polish teeth, and massage gums. While performing this work (oral prophylaxis), they chart conditions of decay and disease for diagnosis by the dentist. They also, may take and develop X-rays, mix filling compounds, apply solutions to the teeth for the control of dental decay, administer prescribed medicaments, sterilize instruments, and act as chairside assistants to the dentists. Hygienists provide dental health education, including the techniques of mouth care and proper diet.

RADIOLOGIC TECHNOLOGISTS

Medical X-rays play a major role in the diagnostic and therapeutic fields of medicine. Radiologic technologists, also called medical X-ray technicians, operate X-ray equipment under the direction of physicians who are usually radiologists (specialists in the use of X-rays).

Most radiologic technologists perform diagnostic work, using X-ray equipment to take pictures of internal parts of the patient's body. They may prepare chemical mixtures, such as barium salts, which the patient swallows to make specific organs appear clearly in X-ray examinations. The technician utilizes proper radiation protection devices and techniques that safeguard against possible radiaiton hazards. After determing the correct voltage, current, and desired exposure time, the technician positions the patient and makes the required number of radiographs to be developed for interpretation by the physician. The technician may use mobile X-ray equipment at a patient's bedside and in surgery. The technician also is usually responsible for keeping treatment records.

Some radiologic technologists perform radiation therapeutic work. They assist physicians in treating diseases, such as certain cancers, by administering prescribed doses of X-ray or other forms of ionizing radiation to the affected areas of the patient's body. They also may assist the radiologist in measuring and handling radium and other radioactive materials.

PHYSICIANS

Physicians diagnose diseases and treat people who are ill or in poor health. In addition, they are concerned with preventive medicine and with the rehabilitation of people who are injured or ill.

Physicians generally examine and treat patients in their own offices and in hospitals, but they also visit patients at home when necessary. Some physicians combine the practice of medicine with research or teaching in medical schools. Others hold full-time research or teaching positions or perform administrative work in hospitals, professional associations, and other organizations. A few are primarily engaged in writing and editing medical books and magazines.

PHYSICIANS (con't)

About one-third of the physicians engaged in private practice are general practitioners; the other two-thirds are specialists in 1 of the 33 fields recognized by the medical profession. In recent years, there has been a marked trend toward specialization. Among the largest speialties are internal medicine, surgery, obstetrics and gynecology, psychiatry, pediatrics,.radiology, anesthesiology, ophthalmology, and pathology.

DENTISTS

Dentists look for and fill cavities in the teeth, straighten teeth, take X-rays of the mouth, and treat gum diseases. Dentists also extract teeth and substitute artificial dentures especially designed for the individual patient. In addition, they clean teeth and examine the mouth for diseases. They spend most of their time with patients, but some time may be devoted to laboratory work such as making dentures and inlays.

Most dentists are general practitioners who provide many types of dental care; only about 9 percnet are recognized as specialists. About half of these specialists are orthodontists, who straighten teeth. The next larger number, oral surgeons, perform operations in the mouth and jaws. The remainder specialize in periodontoloty (treating the tissues that support the teeth), prosthodontics (making artificial teeth or dentures), pedodontics, (dentistry for children), oral pathology (diseases of the mouth), endodontic (root canal therapy), and public health dentistry.

PHYSICAL THERAPISTS

Physical therapists help persons with muscle, nerve, joint, and bone diseases or injuries to overcome their disabilities. They evaluate and treat patients who are referred to them by physicians through the use of exercises, mechanical apparatus, massage, and applications of heat or cold, light, water, or electricity. Most of their patients are accident victims, crippled children, and disabled older persons.

To obtain information needed to develop programs for treatment, physical therapists perform muscle, nerve, and other functional tests. They also keep records of their patients' progress during treatments and attend conferences with physicians and other medical personnel to discuss this progress. In many instances, they help disabled persons to accept their physical handicaps and learn how to adjust to them. Therapists teach patients how to perform exercises and to use and care for braces, crutches, and artificial limbs. They also may show members of the patients' families how to continue treatments at home.

Physical therapists are members of a health care team that is directed by a physician and may include a nurse, clinical social worker, occupational therapist, psychologist, vocational counselor, and other specialists. Although qualified physical therapists may treat many types of patients, some specialize in caring for children, or for patients having amputations, arthritis, or paralysis.

OCCUPATIONAL THERAPISTS

Occupatioanl therapists plan and direct educational, vocational, and recreational activities designed to help mentally and physically disabled patients become self-sufficient. They work as members of a medical team which, in addition to physicians, may include physical therapists, vocational counselors, nurses, social workers, and other specialists.

About one-third of the total number of occupational therapists work with emotionally handicapped patients, and the rest with persons having physical disabilities. These patients represent all age groups and varying degress of illness.

The treatment of training goals for patients referred for occupational therapy may include regaining physical, mental or emotional stability; developing maximum self-sufficiency in the routine of daily living (such as eating, dressing, writing, and using a telephone); and, in the latter stage of treatment, performing jobs in a practical work situation for eventual return to employment.

As part of the treatment program for adults, occupational therapists teach manual and creative skills, such as weaving, clay modeling, and leatherworking, as well as business and industrial skills such as typing, operating some business machines, and using power tools. In programs for children, they initate and direct activities appropriate to the child's maturation level. Therapists may design and make special equipment or splints to aid some disabled patients in performing their activities.

VETERINARIANS

Veterinarians (doctors of veterinary medicine) diagnose, treat, and control numerous dieeases and injuries among many species of animals. Their work is important for the Nation's food production and for public health. Veterinarians perform surgery on sick and injured animals, and prescribe and administer drugs, medicines, serums, and vaccines. Their work helps to prevent the outbreak and spread of diseases among animals. Because many animal diseases can be transmitted to human beings, this aspect of their work is vital to the public health.

Veterinarians treat animals in veterinary hospitals and clinics, or on the farm and ranch. In addition, veterinarians give advice on the care and breeding of animals.

The majority of veterinarians are general practitioners. Of those who are specialists, the greatest number treat small animals or pets. Some specialize in the health care of cattle, poultry, sheep, swine, or horses. Many veterinarians inspect meat, poultry, and other foods as a part of the Federal and State public health programs. Others are on the faculties of veterinary colleges. Some veterinarians do research related to animal diseases, foods, and drugs; other veterinarians, as part of a medical research team, seek knowledge about the prevention and treatment of human disease.

MEDICAL LABORATORY WORKERS

Laboratory tests play an important part in the detection, diagnosis, and treatment of cancer, tuberculosis, diabetes, meningitis, and other diseases. Medical laboratory workers, often called clinical laboratory workers, include three levels of workers; medical technologists, technicians, and assistants. They perform these tests under the direction of pathologists (physicians who specialize in diagnosing the causes and nature of disease) or other physicians or scientists specializing in clinical chemistry, microbiology, or the other biological sciences. Medical laboratory workers analyze the blood, tissue, and fluids of the human body using a precision instruments, such as microscopes, automatic analyzers, electronic counters, and spectrophotometers. Findings of such tests help physicians treat patients.

Medical technologists, who require 4 years of post-secondary training, perform the more complicated chemical, microscopic, and bacteriological tests and procedures. These tests may include chemical tests to determine blood cholesterol level, or microscopic examination of the blood to detect the possibility of leukemia. Other body fluids may be examined microscopically; cultured to determine the presence of bacteria, parasites, or other microorganisms; and analyzed for chemical content or reaction. Technologists also may type and cross-match blood samples.

Technologists who work in small laboratories often perform many types of tests. Those employed in large laboratories usually specialize in making several kinds of related tests in areas such as microbiology, parasitology, biochemistry, blood banking, hemotology (the study of blood cells), histology (tissue preparation), cytology (analysis of body cells), and nuclear medical technology (the use of radioactive isotops to help detect diseases).

Most medical technologists conduct tests related to the examination and treatment of patients. However, some do research on new drugs or on the improvement of laboratory techniques. Others teach or perform adminstrative duties.

Medical laboratory technicians having various combinations of education and experience perform tasks that require, in general, a higher level of skill than is required for certain routine work done by assistants but which do not involve the technical knowledge of the highly trained technologists. Like technologists and assistants, they may function as generalists in several areas of the laboratory or may specialize in one or more fields.

PHARMACISTS

Pharmacists dispense drugs and medicines and provide information on their use to help protect people's health. They dispense prescriptions ordered by physicians and other medical practitioners, and supply and advise people on the use of many medicines that can be obtained without prescriptions. Pharmacists must understand the use, composition, and effect of drugs and be able to test them for purity and strength. Compounding-the actual mixing of ingredients to form powders, tablets, capsules, ointments, and solutions-is only a small part of present-day pharmacists; work, since many drugs now are produced by manufacturers in the form used by the patient.

PHARMACISTS (con't)

Many pharmacists in drugstore or community pharmacies have sales and managerial as well has professional duties. Besides dispensing drugs, these pharmacists buy and sell other merchandise, hire and supervise store personnel, and oversee the general operation of the store. Some pharmacists; however, operate prescription pharmacies that sell only drugs, medical supplies, and health accessories. Pharmacists in hospitals dispense prescriptions and advise the medical staff on the selection and effects of drugs; they also may make sterile solutions, buy medical supplies, teach in schools of nursing, and perform administrative duties. An increasing number of hospital pharmacists are "clinical pharmacists", who work in patient care areas as active members of the medical team. Some pharmacists, employed as medical sales representatives or "detail men" by drug manuscript and wholesalers, sell medicines to pharmacies and inform practicing pharmacists, doctors, dentists, and nurses about new drugs. Others teach in colleges, perform research, supervise the manufacture of pharmaceuticals, develop new drugs, edit or write articles for pharmaceutical journals, or do administrative work.

PROGRAM OBJECTIVES

The program objectives for the Pre-Post Secondary School Curriculum project are all oriented toward the goal of preparing students for smoother entrance into programs in health occupations in higher education as well as assuring success for the student in the ultimate completion of those programs. Also inherent in the objectives is an attempt to provide orientation into the various aspects of the professions of interest to him.

The objectives and rationale for each follow:

1. To provide the student with an understanding of the respective careers in the health occupations.

Intended in this objective is to give a student a broad perspective of the health industry plus an investigation of its various components. Students would explore relationships between his choice and other health occupations. He would explore work responsibilities, working conditions for each occupation. The objective entails beginning with a very general view of the health industry with an eventual focusing in upon a single area of interest.

2. To introduce students to the program, professional, and personal requirements of his health program choice and to promote student understanding and acceptance of his abilities, interests, and aptitudes in light of his career choice.

Often a student may choose an occupation on the basis of stereotype gained from relationships with people already in the profession and possibly from the medical roles played on commercial television. The student should be made aware of academic programs, requirements, and expectations. He should know what being a professional entails in terms of work hours, conditions, and benefits. Finally, he should know what personal requirements are desirable in order to successfully meet program and professional requirements.

3. To provide the student with guidance and assistance in mapping a goal centered curriculum and offering courses that would provide knowledge and skills necessary for admission into, and successful completion of health programs in higher education.

As the health occupations have unique requirements, a necessary objective is to be certain that the right courses of study are available to students in the right amounts. It is further necessary to provide assurance that orientation and applications in the realted courses is directed towards the needs of the various health occupations.

4. To provide a bank of information on education opportunities and services available to students in their areas of vocational choice.

Quite simply, students should be made aware of the institutions and the types of institutions that have their programs. They should also be aware of services available concerning financial aid, counseling and academic assistance.

5. To provide activities and experiences which allow the student to identify with the profession he envisions entering.

The objective is to get the student out into the real world through the use of in-house audio-visual experiences, speakers and actual visits to or with active professionals in the field. Perhaps arrangements can be made to have students work with professionals part-time over a period of time covered by the project.

THE CURRICULUM

I. Program Rationale and Overview

If a program such as the Pre-Post Secondary Health Curriculum (PPSHC) is to have worth over traditional high school 11th and 12th grade programs, it must reflect a specialization directed towards occupations in the health industry and towards preparation for the higher education requirements needed to enter programs leading to those occupations. At the same time it should be sufficiently complete so that those students who, either as a result of the program or outside experiences discover that a health career is not their objective, will be able to meet the higher education requirements needed to enter programs leading to their newly chosen specialty.

With these ideas in mind, and to accomplish the tasks and objectives listed in Section IV of the Report, the PPSHC program will use a partially integrated approach to the academic content and will leave provision for observation of the health industry at work. Both the academic and observational portions of the program will be centered on the life science core. The academic program will take four days of every week while the fifth day will be devoted to the observational program. Complete descriptions of the academic and observational portions of the program follow in sections II and III.

II. Academic Program

The academic program, or more properly, that part of the total PPSCH program which will be conducted at the instructional center, is designed to meet objective 3 as outlined in Section IV of the Pre-Post Secondary Curriculum Report. The program will be divided into five major areas:

1. Life science
2. Physical science
3. Mathematics
4. Communications
5. Social Studies - Humanities

Each of these areas will be described briefly below, with in depth content and week by week outlines to be found elsewhere in this report.

The five major areas will be partially integrated with life science as the core. The other four areas will be designed to give complete coverage of the usual topics encountered in an honors college pre program, but with the order of topic coverage altered so that the student has the required prerequisite knowledge for the life science core, and with applications drawn primarily, but not exclusively, from health related areas. In this way the student will be able to see the interrelationships between disciplines that are often considered to be separate and unrelated. It will also allow for example, the physical science instructor to concentrate on physical science with the confidence that the students have already encountered all the necessary mathematics, an assumption which can not always be made in traditional programs.

As an example of how this integration of the life science, physical science and mathematics in particular will be handled, consider weeks nine through fifteen of the first year program

ek	9	10	11	12	13	14	15
fe Science		Evolution	Genetics	Genetics	Genetic Diseases	Heredity	Probability & Genetics
ysical Science	Nuclear Structure	Nuclear Transformations	Nuclear Physics	Health Physics			
thematics		Permutations & Combinations	Probability	Statistics	Statistical Inference		

Note how the concepts covered in mathematics and physical science support the life science core. The study of genetics and heredity is highly statistical, thus the students encounter probability and statistics in the math area prior to its application in the life science core. Likewise, genetic diseases and mutations often result from radiation damage, thus the student first encounters the physical ideas about radiation production, detection and protection in the physical science areas prior to its application in the life science core. The full two year program will be designed in the same way, with all areas complementing and supporting each other.

Brief descriptions of the major areas follow:

Life Science

1st year - Basically biology with stress on human biology and microbiology.

2nd year - Human anatomy and physiology with some comparative anatomy.

Physical Science

1st year - Basically chemistry but stronger on organic and biochemistry than the usual program, with heavy dose of nuclear chemistry, and lighter on inorganic.

2nd year - Basically physics but with emphasis on health applications, and heavy on electronics and instrumentation.

Mathematics

1st year - Elementary functions with statistics and review of algebra.

2nd year - The calculus through multivariate calculus.

Communications

1st year - Unit studies on short stories, composition, novel and vocabulary.

2nd year - Unit studies on basic speech, drama, poetry and mass media.

Social Studies - Humanities

1st year

2nd year

III. Observational Program

The Observational Program of the PPSHC is designed to meet objectives 1, 2, 4 and 5 of the total program as outlined in Section IV of the Pre Post Secondary Curriculum Report.

The Observational Program will involve at least the following activities:

1. Observational excursions-survey
2. Observational excursions-intensive
3. Instructional center visits by professionals in the health care industry
4. Audio-visual materials center
5. Student visits to schools of higher education

Each of these activities will be enlarged upon below.

This aspect of the program is of sufficient importance that it must be ~~an~~ integral part of the program, with at least one day per week devoted to it.

Activities of the Observational Program

Observational excursions-survey

These experiences will involve all students collectively during their first year program and to a lesser extent during the second year. The excursions will be designed to:

1. acquaint the student with the variety of health related professions
2. allow the student to observe professionals working in the real world
3. show the student that knowledge gained in the classroom is applied in the real world

Although the details will depend on the location of the instructional center, the experience will be handled in the following manner.

Prior to the excursion, the students will be given specific objectives to be accomplished during the day. Depending on the excursion these objectives might include observing specific techniques of analysis, watching the interaction between various professionals, and learning of specific educational requirements from the professional himself. These objectives will be designed to, first of all, make the excursion more than just a field trip, and secondly, stimulate the students to ask additional questions.

We also expect that the various excursions will be arranged in time so that the student will have sufficient technical background from their classroom work to understand what they are observing. Thus, if the excursions involve a visit to an X-ray laboratory, the student will have studied the production and detection of X-rays in his physics section, the physiological effects of X-rays in his phsiology section, etc., prior to the excursion.

The excursion itself will generally involve the total student population breaking into small groups of two or three, with each group visiting the same type facility, but at different locations. In this way a greater variety of experiences can be arranged, and the strain on any one facility involved in the excursion can be reduced.

After the experience, all the students will meet in a seminar or discussion meeting in which they will review the activities of the excursion, compare notes on the procedures and facilities they visited, etc.

Observational excursions-intensive

These experiences will be carried out by the students individually during their second year in the program. Each student will choose 2 or 3 specific areas of interest, and will spend his excursion days working with a professional in these areas. He might typically spend 10 or more weeks working with the same professional.

This experience will be less structured than the survey excursions, but each student will be expected to report his experiences to the other students periodically. This will serve to keep all the students acquainted with activities outside their chosen fields of interest in health care, as well as provide practical experience in developing communication skills.

Instructional center visits by professionals

To keep the relationship of knowledge gained in the classroom to real world experience in front of the students, professionals observed by the students in the field will be invited to the instructional center periodically.

During a typical visit the professional might be asked to present a lecture on a topic of particular interest to his profession, after which he would interact informally with the students, discussing educational requirements, his knowledge of various schools which offer the necessary training, general information about income levels during training, in short, anything of interest about the profession.

This aspect of the program will also involve career days during which representatives of various schools of higher education with programs of interest to the students will be invited to the campus to discuss those programs with the students.

Audio-visual materials center

The center will include information on educational requirements as perceived by the professional organizations, college and professional school catalogues, trade and professional journals, information about the professions, to list only a few.

Visits to professional schools

In order to make a valid choice about further study, the student needs as much information as possible. Although college catalogues and campus representatives can give much useful information about a school and its programs, a campus visit can be very beneficial. Part of the observational program will therefore include campus visits by the student to those schools in which he is interested in light of his career objectives

PROGRAM SCHEDULING

As the academic portion of the Pre-Post Secondary Health Curriculum is to operate on a four day week (not a five), the program necessarily will eliminate the possible use of study halls and extra curricular activities within the usual day-time hours. We are proposing two half day program which may be interchanged. For example, in the morning, the student would take life science and physical science programs including at least two three hour laboratories per week. The afternoon portion of the program would consist of mathematics, communications, and social science. The local situation at Penta County limits the operating day to 8:45 in the morning until 2:45 in the afternoon. This is dictated by the local needs of a joint vocational district. In particular, the lecture discussion portions of the life science and physical science curriculum consists of two 85 minute periods per week. On the other two days of the week, the instructor has the option of using the entire morning for either life science or physical science lab or can use two hours for life science lab or physical science lab and the remaining hour for another lecture-discussion period of either life or physical science program. In the afternoon the student would take four days each of mathematics, communications, and social science. The mathematics period would last fifty minutes, the communications forty-five minutes, and the social science forty-five minutes.

In summary, the life science lecture discussion portion would run 170 to 230 minutes per week. The physical science program would run the same. Each would have 120 to 180 minutes per week of laboratory time. Mathematics would involve 200 minutes per week and communications and social studies one hundred minutes per week. With an entire day of the week devoted to field experience, one can see that the program is very heavily oriented towards laboratory work.

Local situations may again dictate that a different schedule would be appropriate. It is suggested, though, that if a change in schedule is anticipated that the individual doing the change keep in mind the objectives of the program as they were set forth.

STAFFING

In the offering of a single curriculum there are essentially six personnel positions that must be filled. Some of these may involve doubling over so that one individual may accept more than one of the positions. The positions, though, are: 1) The life science instructor, 2) the physical science instructor, 3) the social science instructor, and 4) the field experience coordinator. It is highly recommended though that the physical science instructor, the life science instructor, and the field experience coordinator are in fact the same individual. It would be advisable if the communications instructor and the social science instructor were as well the same individual. Irregardless, though, it is important that no matter how many individuals are involved, that a good dialogue exists between all persons in the program. This is to ensure that the integrated approach that we have proposed is carried out.

As one can readily see, the program itself involves a good knowledge of the discipline to be covered. Foremost in the choice of the staff member must be their knowledge of the discipline to be taught. Secondary consideration should be given to experience with the health industry and teaching experience that the individual may have had. But, without the proper background in the discipline itself, the program could hardly be successful.

It is, therefore, recommended that the academic portions of this program should be covered by people with a masters degree or equivalent in the specific discipline areas to be taught.

MATHEMATICS

The mathematics curriculum for the Pre-Post Secondary Health Curriculum is designed with two thoughts in mind. The first being that the mathematics should support the other discipline areas to be studied. For example, it should support the life science program and the physical science program with the necessary mathematical concepts so that students may go into deeper realms of understanding of the concepts in those areas. The second objective is to give the student sufficient knowledge of mathematics so he is prepared, you might say, in the liberal arts. In other words, if the student should desire to go into some other occupational area not related to health, he will be adequately equipped to do this.

The first year of mathematics curriculum consists of an overview of algebra including a review of algebra I plus what is commonly termed as elementary functions. The course will include topics in probability and statistics and trigonometry.

The second year of the program is essentially a two semester course in differential and integral calculus including topics in the multivaried calculus. The content outline and the weekly course coverages reflect one point of view in presenting calculus. This should not be interpreted as being superior to other content arrangements. The course is fairly independent of the other courses during the second year so that the program may progress by any one of several content approaches. Coverage, though, should be complete to include a firm base in differential and integrate calculus, multivariate calculus, and infinite series.

The mathematics portion of this curriculum is based upon the recommendations of the committee that developed the entire curriculum. Due to local needs and more in depth study of a life science and physical science curriculums it may be necessary to alter the curriculum as it has been designed. Provided there is good dialogue between persons involved in the various components of this program, the instructor-curriculum worker should have no fears about making such changes.

1st Year Mathematics Program

Unit I. Fundamental Concepts and Operations in Algebra

- A. The real number system
- B. Algebraic Symbolism
- C. Fundamental laws of Algebra
- D. Signed numbers and their operations
- E. Operations involving zero
- F. Exponents and radicals review
- G. Addition and subtraction of algebraic expressions
- H. Multiplication and Division of algebraic expressions
- I. Operations on equations and formulas

Unit II. Functions and Graphs

- A. Definition of Function
- B. Graphing
- C. Ratio and Proportion
- D. Variation

Unit III. Linear Equations and Systems of linear equations

- A. Definition of linear equation
- B. Graphical solution of two simultaneous linear equations
- C. Algebraic solution of two simultaneous linear equations
- D. Algebraic solution of three simultaneous linear equations
- E. Solution of two simultaneous linear equations by determinants
- F. Solution of three simultaneous linear equations by determinants
- G. Cramer's Rule

Unit IV. Exponentials and Logarithms

- A. Integral exponents
- B. Scientific notation
- C. Rational exponents

D. Operations of exponentials and radicals

E. Equations containing radicals

F. The logarithmic function

G. Properties of the logarithmic function

H. Computations using logarithms

I. Logarithmic equations

J. Graphs on logarithmic paper

Unit V. Probability and Statistics

A. Permutations and Combinations
  1. Permutations
  2. Formulas for permutations
  3. Combinations
  4. Permutations of objects where some elements are the same

B. Probability
  1. Definitions and introduction
  2. Sample spaces and trees
  3. Events and sets
  4. Mutually exclusive events and partitioning
  5. Random events

C. Statistics (Descriptive)
  1. Introduction and notation
  2. Measures of central tendency
  3. Measures of variability
  4. Distributions of data (Normal, binominal, poison, level)

Unit VI. Polynomial and Rational Functions

A. Factoring and fractions
  1. Review of products of monomials, binomials and polynomials
  2. Factoring quadratics
  3. Multiplication and division of algebraic fractions
  4. Addition and subtraction of algebraic fractions

B. Quadratic Equations
  1. Definition and graphs of quadratic equations
  2. Solution by factoring
  3. Solution by completing the square
  4. Solution by formula
  5. Equation in quadratic form

C. Non-linear systems of equations
  1. Graphical solutions
  2. Algebraic solutions

D. Functions of two variables
   1. Introduction to three dimensional coordinate
   2. Functions of two variables
   3. Simple graphs of functions of two variables

Unit VII. Trigonometry

A. Review of simplest geometric properties of circles and triangles, especailly right triangles
   1. Definition of trigonometry functions as ratios
   2. Values of the trigonometric functions for angles between 0° and 90°.
   3. Problems involving solution of right triangles
   4. Functions of angles greater than 90°.
   5. Radius measure defined in unit trigonometry functions circle.

B. Graphs of the trigonometric functions
   1. Sine and cosine functions
   2. Amplitude, period and phase shift
   3. Tangent and Cotangent functions
   4. Cosecant and Secant functions
   5. Sums of functions
   6. Lissajons figures

C. Trigonometric identities
   1. Basic identities
   2. Solving trigonometric equations using the basic identities

D. Solving oblique triangles
   1. Law of sines
   2. Law of cosines
   3. Applications

E. Polar Coordinates
   1. Coordiante system defined
   2. Transforming from rectangular to polar
   3. Transforming from polar to rectangular
   4. Graphs in polar coodrinates

F. Inverse trigonometric functions

Unit VIII. Vectors and complex numbers

A. Vectors
   1. Vector vs. scaler defined
   2. Vector addition graphically
   3. Vector addition by components
   4. Vector multiplication

B. Complex numbers
   1. Complex numbers as solutions to equations
   2. Rectangular, polar and exponential forms
   3. Addition of complex numbers
   4. Multiplication of complex numbers
   5. Division of complex numbers

IX. Sequences and series

- A. Arithmetic progrssions
- B. Geometric progresions
  - 1. Infinite geometric progressions
- C. Summation notation
- D. Dinomial expansion
- E. Limit of a sequence
- F. Mathematical induction

Unit X. Theory of Equations

- A. Fundamental theorem of algebra
- B. Remainder theorem
- C. Factorization theorem
- D. Synthetic division
- E. Conjugate root theorem
- F. Linear interpolation to obtain irrational roots

Unit XI. Inequalities and linear programming

- A. Properties of inequalities
- B. Linear inequalities
  - 1. Graphical solutions
  - 2. Algebraic solutions
- C. Non-linear inequalities
  - 1. Graphical solutions
  - 2. Critical values
  - 3. Algebraic solutions
- D. Ineaualities in two unknown-graphical solutions
- E. Systems of inequalities-graphical solutions
- F. Linear programming

Unit XII. Analytic geometry

- A. Straight line - //, ⊥, equations, Disl.
- B. Circle
- C. Ellipse
- D. Parabola

E. Hyperbola

F. Translation of axes

G. General second degree equation

H. Polar curves and parametric equations

Unit XIII. Regression and Curve fitting

A. Review of mean, S.D., etc.

B. Correlation coefficient

C. Least squares method for straight lines

D. Least squares techniques for non-linear phenomence-change of variable

E. Confidence levels

F. Least squares method with non-linear data

2nd Year Mathematics

Differential and Integral Calculus

Unit I Fundamental Concepts

A. Relations, functions, and graphs
  1. Definitions
  2. Intecepts, symmetry
  3. Domain, Range, and asymptotes
  4. Composite and inverse functions
  5. Intervals (closed, open, bounds, completeness)

B. Review of Analytical Geometry of the line
  1. The distance formula
  2. The slope of a line
  3. Equations of lines
  4. Parallel and perpendicular lines

Unit II Limits and Continuity

A. Limits
  1. Intuitive Limits
  2. Definition of limits

B. Implications and Theorems on limits

C. The algebra of limits

D. Continuity

Unit III The Derivative

A. The derivative
  1. Tangent to a curve

B. Differentiation Properties

C. Derivatives of polynomials

D. Derivatives of products and quotients

E. The chaoin rule

F. Implicit differentiation

G. Higher order derivatives

Unit IV Applications of the Derivative

- A. Study of curves
  - 1. Increasing and decreasing functions
- B. Maximum and minimum points on open intervals
  - 1. Maximum and minimum points on closed intervals
  - 2. Applications of maximum and minimum
- C. Rate Problems
- D. Percent error
- E. L'Hospital's Rule

Unit V The Integral

- A. Areas
- B. Antiderivative and indefinite integration
- C. The fundamental theorem of calculus
- D. Properties of integrals
- E. Integration by substitution

Unit VI Applications of the Integral

- A. Areas
- B. Volumes
- C. Fluid Pressure
- D. Work
- E. Surface of revolution
- F. Survival functions and renewal theory

Unit VII Differentiation of the transcendental Functions

- A. Differentiation and integration of sine and cosine
- B. The trigonometric functions
- C. The inverse trigonometric functions
- D. Differentiation and integration of logarithmic and exponential functions
- E. Applications

Unit VIII The Hyperbolic Functions

A. The hyperbolic functions

B. The inverse hyperbolic functions

Unit IX Vectors in a plane

A. Parametric equations
  1. Relations in parametric equations
  2. Arc length

B. Curvature

C. Review of polar coordinate
  1. Differentiation in polar coordinates

D. Review of vectors
  1. Vector-valued function and differnetiation

E. Applications

Unit X Methods of integration

A. Summary of basic formulas

B. Algebraic substitution

C. Trigonometric substitution

D. Integration by parts

E. Hyperbolic substitution

F. Partial Fractions

G. Tables of integrals

Unit XI Vectors in a space

A. Rectangular Coordinates in three dimension

B. Vectors in a three dimensional space

C. The scalar product

D. The vector product

E. The triple scalar product

F. Computations with vector products

G. Differentiation

H. Other coordinate systems

I. Applications - centroids and moments of inertia

Unit XII Functions of several variables

A. Definition

B. Graphs

C. Properties of continous functions

Unit XIII Partial Differentiation

A. Limits and continuity

B. Partial derivatives

C. The fundamental lemma

D. The total differential

E. Directional derivatives (gradient)

F. The chain rule

G. The tangent plane

H. Higher derivatives

I. Maxima and minimum

J. Implicit functions

Unit XIV Multiple Integration

A. The double integral

B. Integration with respect to one variable

C. Iterated integrals

D. Integration over standard regions

E. The general theorem of the double integral

F. Applications

G. The double integral in polar coordinates

H. Applications

Unit XV Infinite Series

- A. Convergent and divergent series
    - 1. Series of positive terms
    - 2. Series of positive and negative terms
- B. Power series
- C. M'Laurin's and Taylor's series
- D. Taylor's theorem with remainder
- E. Convergent and divergent series
- F. The geometric series
- G. Power series
- H. Operations with power series

Unit XVI Theory of infinite series

- A. Sequences and series
- B. General properties
- C. Tests of convergence
- D. Alternating series
    - 1. Absolute and conditional convergence
- E. Radius of convergence
- F. Taylor's theorem with remainder
- G. Differentiation and integration of series

PRE-POST SECONDARY HEALTH CAREERS

1st Year Mathematics

Unit 1 Fundamental Concepts and Operations in Algebra

Week 1

Objectives:

1. The student will be able to state the fundamental laws of algebra.
2. The student will be able to perform the basic algebraic operations using signed numbers.

Content:

A. The real number system

B. Algebraic symbolism

C. Fundamental laws of algebra
   1. Commutivity
   2. Associativity
   3. Distributivity of multiplication over addition

D. Signed numbers and their operations

E. Operations with zero

Unit I Fundamental Concepts and Operations in Algebra

Week 2

Objectives:

1. The student will be able to perform algebraic operations with integral exponents.
2. The student will be able to differentiate between an algebraic expression and an algebraic equation.
3. The student will be able to perform the algebraic operations on algebraic expressions.
4. The student will be able to solve algebraic equations for any variable involved in the equation.

Content:

F. Integral exponents and radicals

G. Addition and subtraction of algebraic expressions

H. Multiplication and division of algebraic expression

I. Operations on equations and formulas

Unit II Functions and Graphs

Week 3

Objectives:

1. The student will be able to explain the concept of a function.
2. The student will be able to draw the graph of a function.

Content:

A. Definition of function
    1. Basic idea
    2. Notation

B. Graphing functions
    1. Cartesian coordinate system
    2. Setting up a table of values
    3. Plotting points on a coordinate system
    4. Drawing a smooth curve

Unit II Functions and Graphs

Week 4

Objectives:

1. The student will be able to define ratio and proportion.
2. The student will be able to use the ideas of proportion to scale value.
3. The student will be able to identify different types of variation from graphical shapes.
4. Given data and the variation involved in a situation, the student will be able to write an equation describing the situation.

Content:

C. Ratio

D. Proportion

E. Variation
   1. Direct
   2. Inverse
   3. Joint

Unit III Linear Equations and Systems of Linear Equations

Week 5

Objectives:

1. The student will be able to identify a linear equation.
2. The student will be able to solve two simultaneous linear equations graphically and algebraically.
3. The student will be able to solve three simultaneous linear equations algebraically.

Content:

A. Definition of Linear Equation

B. Graphical solution of two simultaneous linear equations

C. Algebraic solution of two simultaneous linear equations
   1. Substitution
   2. Addition

D. Algebraic solution of three simultaneous linear equations
   1. Substitution
   2. Addition

Unit III Linear Equations and Systems of Linear Equations

Week 6

Objectives:

1. The student will be able to evaluate 2 x 2 and 3 x 3 determinants.
2. The student will be able to solve two or three simultaneous linear equation by determinants.

Content:

E. Determinants
    1. Defined
    2. Evaluating
    3. Some properties

F. Gramer's Rule
    1. Solving two simultaneous linear equations
    2. Solving three simultaneous linear equations

Unit IV Exponentials and Logarithms

Week 7

Objectives:

1. The student will be able to perform algebraic operations with rational exponents.
2. The student will be able to simplify expressions involving exponents and radicals.
3. The student will be able to write numbers in scientific notation.

Content:

A. Exponents
    1. Integral
    2. Rational

B. Operations involving exponents

C. Scientific notation

D. Radicals
    1. Simplifying
    2. Operations involving radicals

Unit IV Exponentials and Integrals

Week 8

Objectives:

1. The student will be able to solve equations involving radicals.
2. The student will be able to define a logarithm.
3. The student will be able to use logarithms to perform arithmetic calculations.

Content:

E. Solving equations involving radicals

F. Logarithms
   1. Definition
   2. Properties
   3. Computational uses

Unit IV Exponentials and Logarithms

Week 9

Objectives:

1. The student will be able to describe a logarithmic function.
2. The student will be able to describe an exponential function.
3. The student will be able to solve exponential and logarithmic equations.

Content:

G. The logarithmic function
   1. Definition
   2. Properties

H. The exponential function
   1. Defined
   2. Properties

I. Exponential and logarithmic equations

J. Graphs on logarithmic paper

Unit V Probability and Statistics

Week 10

Objectives:

1. The student will be able to compute the number of permutations possible when all elements are different.

2. The student will be able to compute the number of combinations possible when all elements are different.

3. The student will be able to compute the number of permutations possible when some elements are the same.

Content:

A. Permutations and Combinations
   1. Permutations
   2. Formulas for permutations
   3. Combinations
   4. Permutations with some elements the same

Unit V Probability and Statistics

Week 11

Objectives:

1. The student will be able to determine the probability of an event occurring from the knowledge of possible outcomes.
2. The student will be able to set up the sample space for an experiment.

Content:

B. Probability
   1. Definitions
   2. Sample spaces and trees
   3. Events and sets
   4. Mutually exclusive events
   5. Random events

Unit V Probability and Statistics

Week 12

Objectives:

1. The student will be able to construct a frequency histogram.
2. The student will be able to determine the mean, median and mode of a distribution.
3. The student will be able to calculate the standard deviation of a set of data.
4. The student will be able to describe the basic features of the common distributions

Content:

- C. Statistics (Descriptive)
  - 1. Introduction and notation
    - a. Frequency histogram
    - b. Frequency curve
  - 2. Measure of control tendency
    - a. Mean
    - b. Median
    - c. Mode
  - 3. Measures of variability
  - 4. Distributions of data
    - a. Level
    - b. Binomial
    - c. Normal
    - d. Poisson

Unit V Probability and Statictics

Week 13

Objectives:

1. The student will be able to form an hypothesis from statistical data, and check that hypothesis by an appropriate method.

Content:

D. Statistical inference
    1. Hypothesis making
    2. Hypothesis testing
        a. Chi squared
        b. t-Test

Unit VI Polynomial and Rational Functions

Week 14

Objectives:

1. The student will be able to multiply monomial, binomial and polynomial expressions.
2. The student will be able to factor quadratic expressions.
3. The student will be able to perform all algebraic operations with expressions involving fractions.

Content:

A. Factoring and Fractions
   1. Products of monomials, binomials and polynomials
   2. Factoring quadratics
   3. Multiplying and dividing fractions
   4. Adding and subtracting fractions

Unit VI Polynomial and Rational Functions

Week 15

Objectives:

1. The student will be able to identify and draw graphs of quadratic functions.

2. The student will be able to solve quadratic equations and equations in quadratic form by factoring, completing the square, and using the quadratic formula.

Content:

B. Quadratic Equations
  1. Graphs of quadratic functions
  2. Solving quadratic equations
    a. Factoring
    b. Completing the square
    c. Quadratic formula
  3. Equations in quadratic form

Unit VI Polynomial and Rational Functions

Week 16

Objectives:

1. The student will be able to solve non-linear systems of equations.
2. The student will be able to graph simple functions in two variables.

Content:

C. Non-linear systems of equations
    1. Graphical solutions
    2. Algebraic solutions

D. Functions of two variables
    1. Three dimensional coordinate system
    2. Functions of two variables
    3. Graphing simple functions in two variables

Unit VII Trigonometry

Week 17

Objectives:

1. The student will be able to define the sine and cosine by the wrapping function on the unit circle.
2. The student will be able to determine the sine and cosine of any number between 0 and 2π from the tabulated values.

Content:

- A. Circular Functions
    1. The wrapping function
    2. Definition of sine and cosine on the unit circle
    3. Values of sine and cosine 0 to 2π
    4. Definition of tangent, cotangent, cosecant and secant

Suggested Activity: Have each student construct a circular function table for his own use by drawing a unit circle on rectangular graph paper.

Unit VII Trigonometry

Week 18

Objectives:

1. The student will be able to sketch the graph of any function of the form y=aF(bx+c) where F is the sine or cosine.

2. The student will be able to determine the sine or cosine of any number between 0 and 2π by referring to a carefully drawn graph of y=sin x and y=cos x.

3. Given a graph of a trigonometric function, the student will be able to derive one of the equations of that graph.

Content:

B. Graphs of the circular function
   1. Defining amplitude, period and phase shift of periodic functions
   2. Sine curve

Unit VII Trigonometry

Week 19

Objectives:

1. The student will be able to sketch the tangent, catangent, secant and cosecant functions.

2. The student will be able to sketch the sum of two circular functions.

Content:

4. Tangent and cotangent curves
5. Secant and cosecant curves
6. Adding two functions
7. Lissajoms figures

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Unit VII Trigonometry

Week 20

Objectives:

1. The student will be able to express any angle in both degrees and radians.
2. The student will be able to express the trigonometric functions as ratios of the sides in right triangles.
3. The student will be able to show the relationship between the trigonometric and circular functions.
4. The student will be able to solve right triangles.

Content:

C. Trigonometric functions
    1. Definition of angle
        a. Degrees
        b. Radians
    2. Geometry of triangles
    3. Trigonometric functions expressed as ratios of sides of right triangles
    4. Relationship of trigonometric and circular functions
    5. Solving right triangles

Unit VII Trigonometry

Week 21

Objectives:

1. The student will be able to state the basic trigonometric identities.
2. The student will be able to use the basic trigonometric identities to solve equations involving trigonometric expressions.

Content:

D. Trigonometric identities
    1. Basic identities
    2. Solving trigonometric equations

Unit VII Trigonometry

Week 22

Objectives:

1. The student will be able to state the laws of sines and cosines.
2. The student will be able to use the laws of sines and cosines to solve any triangle.

Content:

E. Solving triangles
    1. Oblique triangles defined
    2. Law of Sines
    3. Law of Cosines
    4. Applications

Unit VII Trigonometry

Week 23

Objectives:

1. The student will be able to define the inverse functions.

2. The student will be able to evaluate the inverse functions using the trigonometric tables.

Content:

F. Inverse trigonometric functions
   1. Defined
   2. Notation
      a. Arc-
      b. ___ -1
   3. Graphs

Unit VIII Vectors and Complex Numbers

Week 25

Objectives:

1. The student will be able to identify quantities as being scaler or vector quantities.

2. The student will be able to add two or more vectors graphically and by components

3. The student will be able to compute the scaler product of two vectors.

Content:

A. Vectors
   1. Scaler and vector quantities defined
   2. Addition by graphical methods
   3. Addition by components
   4. Scaler product

Unit VII Vectors and Complex Numbers

Week 26

Objectives:

1. The student will be able to express complex numbers in rectangular, polar and exponential form.
2. The student will be able to add, subtract, multiply and divide complex numbers in any form.
3. The student will be able to compute the roots of complex numbers using DeMoivre's Theorem.

Content:

B. Complex numbers
    1. Solutions to equations
    2. Rectangular, polar and exponential forms
    3. Operations
        a. Addition
        b. Multiplication
        c. Division
    4. DeMouivre's Theorem

Unit IX Sequences and Series

Week 27

Objectives:

1. The student will be able to state the principle of mathematical induction.
2. The student will be able to use the principle of mathematical induction to prove algebrain statements about sums of numbers.
3. The student will be able to apply the binomial theorem.

Content:

A. Mathematical induction
    1. The general principle
    2. The summation notation
    3. Applications
B. The binomial theorem

Unit IX Sequences and Series

Week 28

Objectives:

1. The student will be able to distinguish between a sequence and series.
2. The student will be able to evaluate the terms of arithmetic and geometric sequences.
3. The student will be able to calculate the sum of finite arithmetic and finite and infinite geometric series.

Content:

- C. Arithmetic progressions
- D. Geometric progressions
    - 1. Finite
    - 2. Infinite
        - a. Limit of a sequence
        - b. Condition for convergence

Unit X Theory of Equations

Week 29

Objectives:

1. The student will be able to explain the implications of the factorization, remainder and fundamental theorems.
2. The student will be able to use synthetic division to factor polynomials.

Content:

A. Factorization theorem

B. The remainder theorem

C. The fundamental theorem of algebra

D. Synthetic division

Unit X Theory of Equations

Week 30 (½ week)

Objective:

1. The student will be able to obtain irrational roots by interpolation.

Content:

E. Conjugate root theorem

F. Irrational roots by linear interpolation

Unit XI Inequalities and Linear Programming

Week 30 (½ week)

Objectives:

1. The student will be able to solve linear inequalities.

Content:

A. Properties of inequalities

B. Linear inequalities
    1. Graphical solutions
    2. Algebrain solutions

Unit XI Inequalities and Linear Programming

Week 31

Objectives:

1. The student will be able to solve non-linear inequalities.
2. The student will be able to solve inequalities involving absolute values.
3. The student will be able to solve inequalities in two unknowns graphical.

Content:

C. Non-linear inequalities
    1. Graphical solutions
    2. Critical values
    3. Algebraic solutions

D. Inequalities in two unknowns - graphical solutions

Unit XI Inequalities and Linear Programming

Week 32 (½ week)

Objectives:

1. The student will be able to solve systems of inequalities in two unknowns.

2. The student will be able to solve simple maxima-minima problems by the methods of linear programming.

Content:

D. Systems of inequalities - graphical solutions

E. Linear programming

Unit XII Analytical Geometry

Week 32 (½ week)

Objectives:

1. The student will be able to write the equation of a straight line from knowledge of its slope and intercept.
2. The student will be able to determine whether two lines are parallel or perpendicular.
3. The student will be able to determine the equation of a straight line given its graph.

Content:

A. The straight line
    1. Slope-intercept form
    2. Parallel lines
    3. Perpendicular lines
    4. Distance formula

Unit XII Analytical Geometry

Week 33

Objectives:

1. The student will be able to identify equations as being those of a circle, ellipse, parabola or hyperbola.

2. The student will be able to sketch circles, ellipses, parabolas and hyperbolas on a coordiate system from knowledge of the equations without plotting the function.

Content:

B. The circle

C. The ellipse

D. The parabola

E. The hyperbola

Week 34

Objectives:

1. The student will be able to perform a translation of axes.
2. The student will be able to identify the curve represented by a general second degree equation.
3. The student will be able to sketch curves in polar coordinates.

Content:

F. Translation of axes

G. The genral second degree equation

H. Curves in polar coordinates
   1. The straight line
   2. The circle
   3. The cardiod
   4. The limacon
   5. The rose
   6. The lemniscate

I. Parametric equations

Unit XIII Regression and Curve Fitting

Week 35

Objectives:

1. The student will be able to do a least squares linear fit to experimental data.

2. The student will be able to calculate the linear correlation coefficient of the least squares fit.

Content:

A. Review of standard deviation, mean, etc.

B. Least squares method with linear data

C. Linear correlation oceefficient

Unit XIII Regression and Curve Fitting

Week 36

Objectives:

1. The student will be able to determine confidence intervals for linear correlations.
2. The student will be able to do a least squares fit to non-linear experimental data.

Content:

D. Confidence levels

E. Lease squares method with non-linear data

Unit VII Trigonometry

Week 24

Objectives:

1. The student will be able to locate a point using polar coordinates.
2. The student will be able to transform from polar to rectangular coordinates and vice versa.

Content:

G. Polar coordinates
    1. Setting up the coordinate system
    2. Transforming from polar to rectangular
    3. Transforming from rectangular to polar
    4. Graphs in polar coordinates

Pre-Post Secondary Health Careers Program
2nd Year Mathematics
Differential and Intetegral Calculus

Unit I Fundamental Concepts

Week 1

Objectives:

1. The student will be able to determine the intercepts of a function and discuss the symmetry of the function.

2. The student will be able to give the domain, range and asymplotes, if any, of a function.

Content:

A. Relations, functions and graphs
   1. Definitions
   2. Intercepts
   3. Symmetry
   4. Domain
   5. Range
   6. Asymptotes

Unit I Fundamental Concepts

Week 2

Objectives:

1. The student will be able to define a composite function.
2. The student will be able to determine the inverse of a function.
3. The student will be able to explain the meaning of open and closed intervals, boundedness and completeness.

Content:

7. Composite function
8. Inverse functions
9. Intervals
    a. Bounds
    b. Open
    c. Closed
    d. Completeness

Unit I Fundamental Concepts

Week 3 (1/2 week)

Objectives:

1. The student will be able to determine the slope and intercept of a line from its equation.
2. The student will be able to compute the distance from a point to a line or the distance between two lines.
3. The student will be able to determine if two lines are parallel or perpendicular.

Content:

B. Review of analytical geometry of the line
    1. Equation of a line
    2. The slope of a line
    3. The distance formula
    4. Parallel and perpendicular lines

Unit II Limits and Continuity

Week 3 (1/2 week)

Objectives:

1. The student will be able to define the concept of the limits.
2. The student will be able to determine the limits of simple functions as the variable approaches a specified value.

Content:

A. Limits
    1. Intuitive idea of limits
    2. Definition of limit

Unit II Limits and Continuity

Week 4

Objectives:

1. The student will be able to evaluate limits using the basic theorems.
2. The student will be able to discuss the continuity of a function.

Content:

B. Theorems on limits

C. Algebra of limits

D. Continuity

Unit III The Derivative

Week 5

Objectives:

1. The student will be able to use the definition to calculate derivatives.
2. The student will be able to relate the derivative to the tangent to the curve of a function.
3. The student will be able to state and use the properties of derivatives.

Content:

A. Definition of the derivative
    1. As a limit
    2. As the slope of the tangent line to a curve

B. Properties of the derivative

Unit III The Derivative

Week 6

Objectives:

1. The student will be able to calculate the derivatives of polynomials.
2. The student will be able to calculate the derivatives of products and quotients of functions.

Content:

C. Derivatives of polynomials

D. Derivatives of products

E. Derivatives of quotients

Unit III The Derivative

Week 7

Objectives:

1. The student will be able to apply the chain rule to calculate the derivative of composite functions.
2. The student will be able to differentiate implicit functions.
3. The student will be able to compute higher order derivatives.

Content:

F. The chain rule

G. Implicit differentiation

H. Higher Order derivatives

Unit IV Applications of the Derivative

Week 8

Objectives:

1. The student will be able to use the derivative of a function to sketch the function.

Content:

A. The study of curves
    1. Increasing and decreasing functions
    2. Critical points
    3. Points of inflection

Unit IV Applications of the Derivative

Week 9

Objectives:

1. The student will be able to determine maximum and minimum points of functions on open and closed intervals.

Content:

B. Maximum-minimum points
   1. On an open interval
   2. On a closed interval
   3. Applications

Unit IV Applications of Derivative

Week 10

Objectives:

1. The student will be able to apply differentiation techniques to rate problems.
2. The student will be able to use L'Hospital's Rule to evaluate limits.

Content:

C. Rate problem

D. Percent error

E. L'Hospital's Rule

Unit V The Integral

Week 11

Objectives:

1. The student will be able to calculate the area under a curve by numerical techniques.

2. The student will be able to define a definite integral in terms of area.

Content:

- A. Areas under curves
  - 1. Numerical approximation techniques
    - a. The trapezoid rule
    - b. The midpoint formula
    - c. Simpson's formula
  - 2. Definite integrals as infinite sums of limits

Unit V The integral

Week 12

Objectives:

1. The student will be able to determine the anti-derivative, or indefinite integral of simple functions.

2. The student will be able to evaluate the integral of simple functions by applying the Fundamental Theorem of Calculus.

Content:

B. Anti-derivatives and indefinite integration

C. The Fundamental Theorem of Calculus

Unit V The Integral

Week 13

Objectives:

1. The student will be able to apply the basic properties of integrals to integration problems.
2. The student will be able to evaluate integrals by using the substitution method.

Content:

D. Properties of integrals
    1. Linearity
    2. Interval sum

E. Integration by substitution

Unit VI Applications of Intergrals

Week 14

Objectives:

1. The student will be able to apply integration techniques in finding areas, volumes and fluid pressure.

Content:

A. Areas

B. Volume

C. Fluid pressure

Unit VI Applications of Integrals

Week 15

Objectives:

1. The student will be able to apply integration techniques to calculate work, surfaces of revolution and survival functions.

Content:

D. Work

E. Surface of revolution

F. Survival functions and renewal theory

Unit VII The Trancendental Functions

Week 16

Objectives:

1. The student will be able to differentiate and integrate the trigonometric functions.

2. The student will be able to differentiate and integrate the inverse trigonometric functions.

Content:

A. The sine and cosine
   1. Differentiation
   2. Integration

B. The other trigonometric functions

C. The inverse trigonometric functions

Unit VII The Trancendental Functions

Week 17

Objectives:

1. The student will be able to differentiate and integrate the exponential function.
2. The student will be able to differentiate and integrate the logarithmic function.

Content:

D. The exponential function
    1. Differentiation
    2. Integration

E. The logarithmic function
    1. Differentiation
    2. Integration

F. Applications

Unit VIII The Hyperbolic Functions

Week 18

Objectives:

1. The student will be able to define the hyperbolic functions.
2. The student will be able to differentiate and integrate the hyperbolic functions and their inverses.

Content:

A. The hyperbolic functions

B. Derivatives of the hyperbolic functions

C. Integrals of the hyperbolic functions

D. The inverse hyperbolic functions

Unit IX Vectors in a Plane

Week 19

Objectives:

1. The student will be able to describe a vector in parametric form.
2. The student will be able to change from parametric to Cartesian form.
3. The student will be able to determine arc length.

Content:

A. Parametric equations
    1. Definition
    2. Relations in parametric equations

B. Arc length

Unit IX Vectors in a Plane

Week 20

Objectives:

1. The student will be able to determine the curvature of a curve.
2. The student will be able to differentiate in polar coordinates.

Content:

C. Curvature

D. Polar coordinates
   1. Review
   2. Differentiation

Unit IX Vectors in a Plane

Week 21

Objectives:

1. The student will be able to define a vector-valued function.
2. The student will be able to differentiate vector-valued functions.

Content:

E. Vectors
    1. Review
    2. Vector-valued functions
    3. Differentiation

F. Applications

Unit X Methods of Integration

Week 22

Objectives:

1. The student will be able to integrate by using algebraic substitutions.
2. The student will be able to integrate by using trigonometric substitutions.
3. The student will be able to integarte by parts.

Content:

A. Summary of basic methods

B. Algebraic substitution

C. Trigonometric substitution

D. Integration by parts

Unit X Methods of Integration

Week 23

Objectives:

1. The student will be able to integrate by using hyperbolic substitutions.
2. The student will be able to integrate by using partial fractions.
3. The student will be able to integrate by using the integral tables.

Content:

E. Hyperbolic substitutions

F. Partial fractions

G. Integral tables

Unit XI Vectors in Space

Week 24

Objectives:

1. The student will be able to perform algebraic operations with vectors in three dimensions.
2. The student will be able to determine the scaler product of two vectors.

Content:

A. Rectangular coordinates in three dimensions

B. Vectors in three dimensions

C. The scaler product

Unit XI Vectors in Space

Week 25

Objectives:

1. The student will be able to determine the vector product of two vectors.
2. The student will be able to determine the triple scaler product of three vectors.

Content:

D. The vector product

E. The triple scaler product

F. Computations using vector products

Unit XI Vectors in Space

Week 26

Objectives:

1. The student will be able to differentiate vectors.
2. The student will be able to express vectors in cylindrical and spherical coordinates.
3. The student will be able to calculate centroids and moments of inertia.

Content:

G. Differentiation

H. Other coordinate systems
   1. Cylindrical
   2. Spherical

I. Applications
   1. Centroids
   2. Moments of inertia

Unit XII Functions of Several Variables

Week 27

Objectives:

1. The student will be able to graph functions of several variables.
2. The student will be able to discuss the properties of continous functions.

Content:

A. Definitions

B. Graphs

C. Properties of continuous functions

Unit XIII Partial Differentiation

Week 28

Objectives:

1. The student will be able to find the limit of a function of several variables at a point.
2. The student will be able to discuss the continuity of several variables at a point.
3. The student will be able to calcualte partial derivatives of functions of several variables.

Content:

A. Limits and Continuity

B. Partial derivatives

Unit XIII Partial Differentiation

Week 29

Objectives:

1. The student will be able to compute increments of a function using the fundamental lemma.
2. The student will be able to compute the total differential of a function.
3. The student will be able to compute directional derivatives.
4. The student will be able to apply the chain rule in finding partial derivatives.

Content:

C. The fundamental lemma on increments

D. The total differential

E. Directional derivatives

F. The chain rule

Unit XIII Partial Differentiation

Week 30

Objectives:

1. The student will be able to find the tangent plane to a surface.
2. The student will be able to find higher order partial derivatives.
3. The student will be able to find maxima and minima of surfaces.
4. The student will be able to differentiate implicit functions.

Content:

G. The tangent plane

H. Higher derivatives

I. Maxima and minima

J. Implicit functions

Unit XIV Multiple Integration

Week 31

Objectives:

1. The student will be able to evaluate double integrals.
2. The student will be able integrate with respect to one variable.

Content:

A. The double integral

B. Integration with respect to one variable.

Unit XIV Multiple Integrals

Week 32

Objectives:

1. The student will be able to evaluate interated integrals.
2. The student will be able to integrate over standard regions.

Content:

C. Interated integrals

D. Integration over standard regions

Unit XIV Multiple Integration

Week 33

Objectives:

1. The student will be able to evaluate double integrals by the general theorem.

2. The student will be able to evaluate double integrals in polar coordinates.

Content:

E. The general theorem of double integrals

F. Applications
   1. Areas
   2. Volumes
   3. Moments

G. The double integral in polar coordinates

H. Applications

Unit XV Infinite Series

Week 34

Objectives:

1. The student will be able to discuss the meaning of convergent and divergent series.
2. The student will be able to give the basic characteristics of geometric and power series.

Content:

A. Convergent and divergent series

B. The geometric series

C. The power series

D. Operations with power series

Unit XVI Theory of Infinite Series

Week 35

Objectives:

1. The student will be able to discuss the general properties of series.
2. The student will be able to determine whether a series is convergent or divergent.

Content:

A. Sequences and series

B. General properties

C. Tests of convergence
    1. Comparison
    2. Ratio
    3. Integral

Unit XVI Theory of Infinite Series

Week 36

Objectives:

1. The student will be able to determine if a series is absolutely or conditionally convergent.
2. The student will be able to do a Taylor series expansion of a function.
3. The student will be able to differentiate or integrate a series.

Content:

D. Alternating series
    1. Absolute convergence
    2. Conditional convergence

E. Radius of convergence

F. The Taylor series expansion

G. Differentiation and integration of series

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FIELD EXPERIENCE

The Field Experience portion of the Pre-Post Secondary Health Curriculum comprises one of the primary experiences of the program. As mentioned in the introduction of this report, the field experience is designed to provide the student with an understanding of the respective careers in the health occupations, to introduce the student to the program professional and personal requirements of his health program choice, and to promote student understanding and acceptance of his abilities, interests, and aptitudes in light of his career choice. To some extent the field experience also supports and auguments what is done in the classroom during the academic portion of the program. In particular the field experience centers around four activities. The first is to provide the student with specific understandings of the profession that he envisions entering. For example, if the student envisions becoming a physician, the program will attempt to get a one-to-one correspondence between him and a practicing physician so that he can find out what the physician does, how he does his work, and in particular what that persons life style is. Secondly, the field experience will provide students with contact with other professionals in the health industry to give him perspective of the whole indsutry itself. This will be accomplished by the student going out and visiting professionals outside of his area of interest. The third type of experience centers on applications of work that the student has already done in the classroom. For example, when the student has studied cells, and cell division, visitation may be made to the American Cancer Society or to a cancer research laboratory or to some other revelant facility. Finally, there will be activities with colleges and professional schools that the students might likely attend.

In the local situation, the teacher or the coordinator of the field experience program will have to have considerable leeway to change what is in the curriculum project as stated here in order that they can meet local situations as they may exist. The seventy-two experiences listed in this curriculum are based upon the availability of experiences in the metropolitan Toledo area.

Irregardless, though, of the type of the field experience that may be instigated, the general format should remain the same. That is, the student should have certain preliminary activities preceeding the field experience; the student should then have clearly defined objectives he will meet during that field experience; and finally there should be carefully defined follow-up activities following that field experience. The whole activity should be carefully monitored by the instructor of the program. Efforts should always be made to make sure that the experiences are related to the objectives of the program or the academic work that is going on concurrently with the experience itself.

Life Science
Field Experience
Career Day

Focus:

To obtain an overview of the health field and encounters with specific professions.

Developmental Objectives:

To provide the student with perspective of the health industry by understanding the respective careers opportunities in the respective occupation areas.

Behavioral Objectives:

1. The student will be able to describe the divisions of the health fields and how they interrelate to one another.
2. The student will be able to identify the career opportunities in the field of interest to him and the requirements of that field.
3. The student will write a one page report relating his abilities against the requirements of his chosen profession.
4. The student will select what profession or technical area about which he is interested in having more in depth knowledge.

Student Preparation:

None

Activities:

1. The group will as a whole have a speaker (or speakers) and view films related to various health fields.
2. The group will break into small discussion groups to clarify information received in the larger group.
3. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

Resource Materials:

Occupational Handbook

Life Science

Observation of Electron Microscope

Focus:

Operation of the electron microscope

Developmental Objectives:

To provide the student with observational experience with advanced research instruments used in medical research.

Behavioral Objectives:

1. The student will be able to compare the lens system and the operating procedure of the electron microscope to that of the light microscope.
2. The student will be able to describe advantages and disadvantages of the electron microscope.
3. The student will be able to identify the areas of life science which utilize the electron microscope.
4. The student will be able to identify career opportunities in this field and the requirements of them.

Student Preparation: To be done in pre-conference

1. Review the construction, care and use of the light microscope.
2. Outline or list specific information you expect to gain from this experience.
3. View film related to construction and use of electron microscope.

Activities:

1. Observe the electron misroscope, look at the lens system, its application and the operation of the electron microscope.
2. Determine the advantages and disadvantages of the electron microscope.
3. Determine the areas of life science that utilize the electron microscope.
4. Determine the careers available in this field and the requirements for these careers.
5. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

Life Science

Professional Observation Experience

Focus:

To get acquainted with the professional with whom the student will observe for a period of time.

Developmental Objectives:

To provide an activity and experience which will allow the student to identify with the profession he envisious entering.

To provide an activity and experience which will allow the student to explore the daily life and working conditions of his professional choice.

Behavioral Objectives:

1. The student will be able to describe the type of work in which the professional is engaged.
2. The student will obtain information from the professional regarding his preparation for his occupation and will compare that against statements in the Occupational Handbook.

Student Preparation:

1. Read the description of the field of the student's interest in the Occupational Handbook.
2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should spend three quarters of the day with the professional in his field of interest.
2. A seminar will be held at the end of the day to discuss the experience.
3. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

Life Science

Observation of the American Cancer Society

Focus:

Function of American Cancer Society

Developmental Objectives:

To provide the student with observational experience in supporting medical service organizations as related to content coverage in the Life Science course.

Behavioral Objectives:

1. The student will be able to describe the financial resources, research projects, and media resources of the American Cancer Society.
2. The student will be able to identify the aid offered by the American Cancer Society to cancer patients.
3. The student will be able to determine who is eligible to receive aid from the Cancer Society and what the regional borders are.
4. The student will be able to determine his role in aiding the cancer society.
5. The student will be able to identify career opportunities in this field and the requirements of them.
6. The student will be able to determine the relationship of the American Cancer Society to the profession of his interest.

Student Preparation:

1. Collect information about the American Cancer Society and its purpose.
2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. A visit should be made to the local ACS unit.
2. The student should seek answers to the following questions:
    a. What are the sources of funds for the American CAncer Society.
    b. What type of research projects are being pursued?
    c. What media resources are available, films, pamphlets, slides?
    d. What type of aid is offered to the cancer patient and who are the recipients of aid?

Activities: (con't)

e. What are the regional boundaries of determining which society aids patients or supplies materials to the communities?

f. What is your role in aiding the cancer society?

g. What careers are available in this field? What are the requirements of them?

3. Seminar following experience.

4. The student should , through his own research, determine the importance or lack of importance of the American Cancer Society as it relates to his specific field of interest.

5. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

Life Science

Observation of a Cancer Research Facility

Focus:

Types of research being done on cancer and recent developments in this research.

Developmental Objectives:

To promote student understanding of professional opportunities in the field of medical research.

Behavioral Objectives:

1. The student will be able to describe the types of research being done on cancer.
2. The student will be able to summarize some recent developments in cancer research.
3. The student will be able to summarize the financial resources for this particular research.
4. The student will be able to identify career opportunities in this field and the requirements of them.
5. The student will be able to identify the type of equipment being used in cancer research.
6. The student will be able to determine the relationship of the Cancer Research to the profession of his interest.

Student Preparation:

1. Read at least one article on cancer research.
2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. A visit should be made to a local cancer research facility if available.
2. The student should seek answers to the following questions:
    a. What types of research are being done on cancer?
    b. What are the recent developments in cancer research?
    c. What are the financial resources for this project?
    d. What are the career opportunities in this field and what are the requirements for them?

Activities: (con't)

e. What type of equipment is used in cancer research?

3. Seminar following experience.

4. The student should, through his own research, determine the importance or lack of importance of Cancer Research as it relates to his specific field of interest.

5. Submit a one page written report of your findings. This report should be related to objectives, reparation and activities.

Life Science

Observation in General Hospital

Focus:

Overview of a general hospital.

Developmental Objectives:

To provide the student with observational experience to develop an understanding of the occupational opportunities available in a general hospital and a perspective as to how this may relate to their professional choices.

Behavioral Objectives:

1. The student will be able to describe the services available in a general hospital.
2. The student will be able to describe the professional and technical personnel and their roles in the health field.
3. The student will be able to specifically describe the role of the general hospital as it relates to his professional field of interest.

Student Preparation:

1. The students should be split into small groups and sent to various general hospitals in the community.
2. The student should determine what services are available in the general hospital and observe the various departments of the hospitals as well as the personnel in these departments.
3. At the end of the day, the students in a seminar should compare and contrast the experiences of the various small groups.
4. The student should, through his own research, determine the role of the general hospital as it relates to his professional field of interest.
5. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

Tentative Rotation of Students

Group	Week 6	Week 7	Week 8	Week 9
1	Cytology Laboratory	Veterinarian	Physician	Physical & Occupational Therapist
2	Physical & Occupational Therapist	Cytology Laboratory	Veterinarian	Physician
3	Physician	Physical & Occupational Therapist	Cytology Laboratory	Veterinarian
4	Veterinarian	Physician	Physical & Occupational Therapist	Cytology Laboratory

Students will break into groups of 3 or 4 students and rotate through the various experiences.

Life Science

Observation of Cytology Laboratory

Focus:

Function of the cytology laboratory
Role of cytology technician

Developmental Objectives:

To provide the student with experience which will allow him to gain a perspective of the health industry through study of specific professions.

Behavioral Objectives:

1. The student will be able to describe the function of the cytology laboratory.
2. The student will be able to describe the role of technician.
3. The student will be able to describe career opportunities in this field and the requirements for them.
4. The student will be able to determine the role of cytology as it relates to his professional field of interest.

Student Preparation:

1. Review microscope technique.
2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The students should visit a cytology laboratory in the community.
2. The student should seek answers to the following questions:
    a. What is the function of the cytology laboratory?
    b. What techniques did you observe the laboratory technician using?
    c. What was the significance of these techniques?
    d. How do the techniques you observed compare to those you learned in class?
    e. What is the role of the laboratory technician in the cytology laboratory?
    f. What careers are available in this field? What are the requirements for these careers?
3. The student through his own research, should determine the role of cytology to his professional field of interest.
4. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

Life Science

Veterinarian

Focus:

Role of the veterinarian

Developmental Objectives:

To provide the student with experience which will allow him to gain a perspective of the health industry through study of specific professions.

Behavioral Objectives:

1. The student will be able to describe the role of veterinarian.
2. The student will be able to describe the daily activities of a veterinarian.
3. The student will be able to describe career opportunities and requirements for the veterinarian.
4. The student will be able to describe licensure requirements for veterinarians.
5. The student will be able to describe the role of the veterinarian as it relates to his professional field of interest.

Student Preparation:

1. Review entrance requirements for school of veterinarian medicine.
2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The students should visit a local veterinarian.
2. The student should seek answers to the following questions:
    a. What is the role of the veterinarian?
    b. What type of approach does the veterinarian use?
    c. What are the career opportunities and the requirements for becoming a veterinarian?
    d. What are the licensure requirements for a veterinarian?
3. The student through his own research, should determine the role of veterinary medicine as it is related to his professional field of interest.
4. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

Life Science

Family Physician

Focus:

The role of the physician

Developmental Objectives:

To provide the student with experience which will allow him to gain a perspective of the health industry through study of specific professions.

Behavioral Objectives:

1. The student will be able to describe the role of the family physician.
2. The student will be able to describe the entrance requirements for becoming a family physician.
3. The student will be able to describe the career opportunities for a family physician, and the preparation necessary for becoming a family physician.
4. The student will be able to describe the licensure requirements and certification requirements for a family physician.
5. The student will be able to describe the role of the family physician as it relates to his professional field of interest.

Student Preparation:

1. Read an article on the family physician.
2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a local family physician.
2. The student should seek answers to the following questions:
    a. What is the role of the family physician?
    b. What are the entrance requirements for becoming a family physician?
    c. What are the career opportunities for a family physician? What preparation is required?
    d. What are the licensure requirements or certification requirements for a family physician.

Family Physician (con't)

Activities: (con't)

3. The student, through his own research, should determine the role of the family physician as it relates to his professional field of interest.

4. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

Weeks 6, 7, 8 and 9

Life Science

Physical & Occupational Therapist

Focus:

Function of the physical therapist and the physical therapy department. Function of the occupational therapist and the occupational therapy department.

Developmental Objectives:

To provide the student with experience which will allow him to gain a perspective of the health industry through study of specific professions.

Behavioral Objectives:

1. The student will be able to describe the role of physical therapist and occupational therapist and also the functions of the respective departments.
2. The student will be able to describe the career opportunities and requirements for becoming physical therapist and for becoming an occupational therapist.
3. The student will be able to describe the role of the physical and occupational therapist as it relates to his professional field of interest.

Student Preparation:

1. Read articles on physical therapy and occupational therapy.
2. Review the entrance requirements for physical therapy and occupational therapy education.
3. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a physical therapist and an occupational therapist.
2. The student should seek answers to the following questions:
    a. What is the role of the physical therapist and occupational therapist.
    b. What is the function of each department?
    c. What are the career opportunities and requirements for each therapist?
    d. How do the roles, functions and opportunities availalbe in each area differ
3. The student, through his own research, should determine the role of the physical and occupational therapist as it relates to his professional field of interest.

Physical & Occupational Therapist (con't)

Activities: (con't)

4. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

Weeks 10, 11, 12, 13, 14 and 15

Life Science

Tentative Rotation of Students

Group	Week 10	Week 11	Week 12	Week 13	Week 14	Week 15
1	Genetic Laboratory	Radiation Experiment	Nuclear Power Plant	Radiology	Nursing	Dentistry & Dental Hygiene
2	Radiation Experiment	Nuclear Power Plant	Radiology	Nursing	Dentistry & Dental Hygiene	Genetic Laboratory
3	Nuclear Power Plant	Radiology	Nursing	Dentistry & Dental Hygiene	Genetic Laboratory	Radiation Experiment
4	Radiology	Nursing	Dentistry & Dental Hygiene	Genetic Laboratory	Radiation Experiment	Nuclear Power Plant
5	Nursing	Dentistry & Dental Hygiene	Genetic Laboratory	Radiation Experiment	Nuclear Power Plant	Radiology
6	Dentistry & Dental Hygiene	Genetic Laboratory	Radiation Experiment	Nuclear Power Plant	Radiology	Nursing

Students will break into groups of 2 to 3 students and rotate through the various experiences. At the end of the 6 weeks, the students should meet together in a seminar to discuss the experiences of the six weeks.

Life Science

Observation of a Genetic Laboratory

Focus:

Function of Genetic Laboratory

Developmental Objectives:

To provide the student with relevant application of the concepts covered in the academic program.

To provide the student with perspective of the health industry through observation of a working laboratory.

Behavioral Objectives:

1. The student will be able to describe the purpose of the genetic laboratory.
2. The student will be able to describe the techniques utilized to determine genetic disease.
3. The student will be able to describe the significance of genetic counseling.
4. The student will be able to describe career opportunities in this field, and the requirements for each.
5. The student will be able to describe the role of the genetic laboratory as it relates to his professional field of interest.

Student Preparation:

1. Review genetically caused diseases.
2. Review the difference between gentically caused diseases and organic diseases.
3. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student will visit a local genetic laboratory.
2. The student will seek answers to the following questions:
   a. What is the purpse of the genetic laboratory?
   b. What techniques are utilized for genetic counseling?
   c. Who does genetic counseling and what is the significance of genetic counseling?
   d. What careers are available in this area and what are the requirements for these careers?

Observation of a Genetic Laboratory (con't)

Activities:

3. The student through his own research, should determine the role of the genetic laboratory as it relates to his professional field of interest.

4. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

Radiation in the Environment

Focus:

Radiation levels in the surroundings

Developmental Objectives:

To provide the student opportunities for doing independent investigation in the field of health physics.

Behavioral Objectives:

1. The student will be able to discuss the radiation levels encountered in the everyday environment.
2. The student will be able to describe the use of the Geiger counter as a detection tool.

Student Preparation:

1. Review use of a Geiger counter.
2. Draw a schematic diagram or map to scale of the area to be investigated.
3. Review dosage measurement units.

Activities:

1. Choose an area where the study of radiation levels may be important. Canvas the assigned area, recording radiation levels often on the prepared diagram.
2. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

Life Science

Observation of Nuclear Power Plant

Focus:

Nuclear Power Plant

Developmental Objectives:

To provide the student with relevant application of the concepts covered in the academic program.

Behavioral Objectives:

1. The student will be able to identify procedures used by the nuclear power industry to safeguard their personnel and the general public.
2. The student will be able to describe the operation of a nuclear power plant.

Student Preparation:

1. Review basic ideas of nuclear fission.
2. Review radiation dosage measurements and safe levels.
3. Read an article about nuclear power plants.
4. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a nearby nuclear power plant.
2. The student should seek answers to the following questions:
   a. What governmental (federal, state and local) bodies oversee nuclear power plant safety?
   b. What restirctions are placed on the plants by those agencies?
   c. What methods are used to measure the radiation exposure of employees?
   d. What safeguards are employed to protect the public?
3. Write a one page report discussing the potential dangers of nuclear power and the measures taken to reduce or eliminate those dangers by the power industry.

Life Science

X-Ray Technician and Radiologist

Focus:

Role of the technician and radiologist

Developmental Objectives:

To provide the student with observation experience which will promote a perception of the health industry through the study of specific professions.

Behavioral Objectives:

1. The student will be able to describe the role of x-ray technician and radiologist.
2. The student will be able to describe the role of the technician and radiologist with the patient.
3. The student will be able to describe career opportunities and requirements for becoming x-ray technician and radiologist.
4. The student will be able to describe the role of the technician and radiologist as it relates to his professional field of interest.

Student Preparation:

1. Review entrance requirement for x-ray technician and radiologist and what schools are available.
2. Outline or list specific information you expect or would like to gaine from this experience.

Activities:

1. The student should visit an x-ray laboratory.
2. The student should seek ansers to the following questions:
    a. What is the role of x-ray technician and radiologist?
    b. What is the role of technician and radiologist with the patient?
    c. What are the career opportunities and requirements for becoming technician and radiologist?
    d. What are the certification requirements?
3. The student, through his own research, should determine the role of the x-ray technician and radiologist as it relates to his professional field of interest.
4. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

Life Science

Nursing

Focus:

Overview of Nursing

Developmental Objectives:

To provide the student with observation experience which will promote a perception of the health industry through the study of specific professions.

Behavioral Objectives:

1. The student will be able to describe the role of the nurse.
2. The student will be able to describe the entrance requirements for becoming a nurse.
3. The student will be able to describe the career opportunities available in nursing.
4. The student will be able to describe the preparation that is necessary for the various levels of nursing.
5. The student will be able to describe the licensure requirements and certification requirements for a nurse.
6. The student will be able to describe the role of the nurse as it relates to his provessional field of interest.

Student Preparation:

1. Read an article about nursing.
2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a nurse.
2. The student should seek answers to the following questions:
    a. What is the role of the nurse?
    b. What are the entrance requirements for becoming a nurse? Semi-professional or professional.
    c. What career opportunities are available for the nurse? What preparation is required?
    d. What are the licensure requirements or certification requirements for the various levels of nursing?

Nursing (con't)

Activities:

3. The student, through his own research, should determine the role of the nurse as it relates to his professional field of interest.

4. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

Life Science

Dentistry

Focus:

Overview of Dentistry

Developmental Objectives:

To provide the student with observation experience which will promote a perception of the health industry through the study of specific professions.

Behavioral Objectives:

1. The student will be able to describe the role of the dentist and dental hygienist.
2. The student will be able to describe the entrance requirements for becoming a dentist or dental hygienist.
3. The student will be able to describe the career opportunities available in each of these fields.
4. The student will be able to describe the preparation that is necessary for each of these fields.
5. The student will be able to describe the licensure requirements and certification requirements for each of these fields.
6. The student will be able to describe the role of the dentist or dental hygienist as it relates to his professional field of interest.

Student Preparation:

1. Read an article about dentistry.
2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a dentist's office.
2. The student should seek answers to the following questions:
    a. What is the role of the dentist? Dental hygienist?
    b. What are the entrance requirements for becoming a dentist? Dental hygienist?
    c. What career opportunities are available in each of these fields.
    d. What are the licensure requirements or certification requirements for each of these fields.

Dentistry (con't)

Activities: (con't)

3. The student should determine the role of the dentist and dental hygienist as it relates to his professional field of interest.

4. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

Observation of Bacteriology Laboratory

Focus:

Function of Bacteriology Laboratory

Developmental Objectives:

To provide the student relevant application of the concepts covered in the academic program.

To provide the student with perspective of the health industry through observation of a working laboratory.

Behavioral Objectives:

1. The student will be able to describe in a written report the overall function of the Bacteriology laboratory.

2. The student will be able to describe in a written report some of the methods utilized in performing the function of a bacteriology laboratory.

3. The student will be able to describe in a written report the role of the bacteriology laboratory as it relates to his professional field of interest.

4. The student will be able to describe in a written report the career opportunities in this field, and the general requirements for each.

Student Preparation:

1. Review bacteria caused diseases.

2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student will visit a local bacteriology laboratory.

2. The student should seek answers to the following questions:

   a. What is the purpose of the bacteriology laboratory?

   b. How does it function in terms of supporting the endeavors of other health groups?

   c. What careers are available in the area and what are the requirements for these careers?

3. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

Life Science

Observation of a Fossil Fuel Power Plant

Focus:

Fossil fuel power plant safety

Developmental Objectives:

To provide the student with relevant application of the concepts covered in the academic program.

Behavioral Objectives:

1. The student will be able to describe a working fossil fuel power plant.
2. The student will be able to describe the anti-pollution procedures employed by the plant.

Student Preparation:

1. Read an article on fossil fuel power plants.
2. Review energy conversion processes.
3. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a nearby fossil fuel power plant.
2. The student should seek answers to the following questions:
   a. What is the quantity of fossil fuel consumed per day?
   b. What steps have been taken to reduce atmospheric pollution?
   c. What health personnel are immediately available at the plant?
3. Seminar following the experience
4. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

Life Science

Observation of a Refinery

Focus:

The refinery and health safety.

Developmental Objectives:

To provide the student with relevant application of the concepts covered in the academic program.

Behavioral Objectives:

1. The student will be able to describe the physical principles involved in the refining process.
2. The student will be able to describe the safety precautions taken to protect the health of employees.

Student Preparation:

1. Review the chemistry of petroleum products.
2. Review the relationship of temperature and change of state.
3. Read an article on refining techniques.
4. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a local refinery.
2. The student should seek answers to the following questions:
   a. How many constituents are seperated in the cracking tower?
   b. What precautions are taken to protect the health of employees?
   c. What is the daily output of the refinery?
3. Seminar following the experience.
4. Write a one page report on refinery operation using the knowledge gained from your reading and observations.

Life Science

Tentative Rotation of Students

	Week 18	Week 19
Group 1	Industrial Biology	Soil Laboratory
Group 2	Soil Laboratory	Industrial Biology

Students will break into 2 groups of 9 students each and visit the areas listed above. At the end of 2 weeks, the students should meet together to discuss the experiences of the two weeks.

Life Science

Observation of Dairy Industry, Brewer, Bottling Co., Food Processing Co.

Focus:

The application of Industrial biology

Developmental Objectives:

To provide the student relevant application of the concepts covered in the academic program.

To provide the student with perspective of the health industry through observation of a industrial microbiology laboratory.

Behavioral Objectives:

1. The student will be able to describe the purpose and application of microbiology in industry.
2. The student will be able to describe the procedures for preparing foods and beverages and the significance of these procedures and compare the procedure used in industry to those they have learned in class.
3. The student will be able to describe career opportunities in this field and the requirements for them.

Student Preparation:

1. Review industrial use of microbiology knowledge, especially fermentation and pasteurization and the previous experiments which you have completed.
2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a local dairy, brewery, bottling company, food processing company or other industyr that makes intensive use of microbiology.
2. The student should seeks answers to the following questions:
    a. What is the purpose of the laboratories?
    b. In what ways is microbiology applied in industry?
    c. What procedures did you observe utilized for the preparation of foods and beverage? What are these procedures done?
    d. How do the procedures employed compare to those you have learned in class?
    e. What careers are available in this area, and what are the requirements for these careers?

Activities: (con't)

3. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

Life Science

Observation of a Soil, Water & Food Testing Laboratory

Focus:

The function of a testing laboratory

Developmental Objectives:

To provide the student relevant application of the concepts covered in the academic program.

To provide the student with perspective of the health industry through observation of a soil, water and food testing laboratory.

Behavioral Objectives:

1. The student will be able to state the purpose of the laboratory.
2. The student will be able to identify the methods utilized in soil, water and food testing.
3. The student will be able to describe the significance of soil, water and food testing.
4. The student will be able to describe career opportunities in this field and the requirements for them.

Student Preparation:

1. Review industrial use of microbiology knowledge.
2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a local soil, water and food testing laboratory.
2. The student should seek answers to the following questions:
    a. What is the purpose of the laboratory?
    b. What are the methods used for testing soil, water and food? Were you able to participate in performing any of these tests?
    c. Why is this testing done?
    d. How is microbiology applied in industry? Describe what you saw that leads you to this conculsion?
    e. What careers are available in this field? What are the requirements for these careers?
3. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

Life Science

Observation of a Tissue Bank (Tissue Laboratory)

Focus:

- The function of the tissue laboratory or tissue bank.

Developmental Objectives:

To provide the student with perspective of the health industry through observation of a tissue laboratory.

Behavioral Objectives:

1. The student will be able to state the purpose of the tissue bank or tissue laboratory.
2. The student will be able to describe the methods of tissue typing and the methods of storage.
3. The student will be able to identify the sources of tissue that is stored in the tissue bank.
4. The student will be able to describe current research.
5. The student will be able to describe career opportunities in this field and the requirements for them.
6. The student will be able to describe the role of the tissue bank as it relates to his professional field of interest.

Student Preparation:

1. Review basic principles of immunology.
2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a local tissue bank.
2. The student should seek answers to the following questions:
    a. What is the purpose of the tissue bank?
    b. What procedures did you see utilized at the center?
    c. What are the sources of tissue for the bank?
    d. What research is being done in this field?
    e. What careers are available in this field? What are the requirements for these careers?

Week 20 Alternate A (con't)

Activities: (con't)

3. The student through his own research should determine the role of the tissue bank as it relates to his professional field of interest.

4. Seminar following the experience.

5. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

Life Science

Observation of an Allergy Center

Focus:

The function of the allergy center

Developmental Objectives:

To provide the student with perspective of the health industry through observation of an allergy center.

Behavioral Objectives:

1. The student will be able to state the purpose of the allergy center.
2. The student will be able to describe procedure utilized in the treatment of allergy patients and the purpose of these procedures.
3. The student will be able to describe current research of allergy.
4. The student will be able to describe career opportunities in this field and the requirements for them.
5. The student will be able to describe the role of the allergy center as it relates to his professional field of interest.

Student Preparation:

1. Review antigen-autibody reaction.
2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit an allergy center.
2. The student should seek answers to the following questions:
    a. What is the purpose of the allergy center?
    b. What procedures did you see utilized at the center? Why were these procedures used?
    c. What research is being done on allergy?
    d. What careers are available in this field? What are the requirements for these careers?
3. The student through his own research should determine the role of the allergy center as it relates to his professional field of interest.
4. Seminar following the experience.
5. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

Life Science

Observation of a Blood Bank and Blood Bank Laboratory

Focus:

The function of the Blood Bank

Developmental Objectives:

To provide the student relevant application of the concepts covered in the academic program.

To provide the student with perspective of the health industry through observation of a blood bank and blood bank laboratory.

Behavioral Objectives:

1. The student will be able to state the purpose of the blood bank and blood bank laboratory.
2. The student will be able to describe the methods of typing and cross matching.
3. The student will be able to compare the commercial blood bank to the volunteer donor blood bank and the screening involved for the donors.
4. The student will be able to describe how blood and the components of blood are stored.
5. The student will be able to describe the services offered by the blood bank.
6. The student will be able to describe how he can aid the blood bank.
7. The student will be able to describe the career opportunities in this field and the requirements for them.
8. The student will be able to describe the role of the blood bank as it relates to his professional field of interest.

Student Preparation:

1. Review antigen-autibody reaction.
2. Review ABO compatibility and Rh factor.
3. Review blood disorders, complications and reactions of blood transfusions.
4. Read about commercial blood banks.
5. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a local blood bank.

2. The student should seek answers to the following questions:

   a. What is the purpose of the blood bank and blood bank laboratory

   b. How are typing and cross matching done?

   c. How does a commercial blood bank differ from a volunteer blood bank. What screening takes place in each? What problems are involved with commercial blood?

   d. How is blood stored? What happens to blood after 21 days?

   e. What services are offered by the blood bank to the public?

   f. What can you do to aid the blood donor program?

   g. What careers are available in this field? What are the requirements for these careers?

3. The student through his own research should determine the role of the blood bank as it relates to his professional field of interest.

4. Seminar following the experience.

5. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

Life Science

Observation of an Immunization Clinic

Focus:

The function of the Immunization Clinic

Developmental Objectives:

To provide the student relevant application of the concepts covered in the academic program.

To provide the student with perspective of the health industry through observation of an immunization clinic.

Behavioral Objectives:

1. The student will be able to state the purpose of the immunization clinic.
2. The student will be able to describe types and methods of immunization.
3. The student will be able to describe the services available to the public.
4. The student will be able to describe career opportunities in this field and the requirements for them.
5. The student will be able to describe the role of the immunization clinic as it relates to his professional interest.

Student Preparation:

1. Review basic principles of immunology.
2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a local immunization clinic.
2. The student should seek answers to the following questions:
    a. What is the purpose of the immunology clinic?
    b. What methods of immunization did you see utilized at the clinic? Why were these methods of immunization used?
    c. What services are available to the public?
    d. What careers are available in this field? What are the requirements for these careers?
3. The student, through his own research, should determine the role of the immunization clinic as it relates to his professional field of interest.

Activities: (con't)

4. Seminar following the experience.

5. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

Life Science

Campus Representative Day

Focus:

Visitation to University or College

Developmental Objectives:

To provide the student specific information about professional schools and their requirements in their occupational field of interest.

Behavioral Objectives:

1. The student will be able to select some of the universities that offer programs within the student's field of interest.
2. The student will be able to describe the requirements for entrance to each university and to the program within his field of interest.
3. The student will be able to describe financial requirements and resources available for achievement of the program within his field of interest.
4. The student will be able to compare th entrance requirements, financial requirements and resrouces, and the curriculum of each university that he has selected.

Student Preparation:

1. Review the college catalogue of each university of interest.
2. Have a conference with the guidance counselor from the respective high school of the student to prepare for the day.
3. Think about your goals, and what you plan to do with your future.

Activities:

1. The student should meet with a number of campus representatives who have been invited to the instructional center for the day.
2. The student should answer the following questions:
    a. What universitites have you selected? Why?
    b. What are the entrance requirements of each university and also the program in which you are interested?
    c. What are the financial requirements of the program in which you are interested? What kind of financial aid can you expect?
    d. Compare entrance requirements financial requirements and curriculum of each school. What led to your decision to select one school above the other?

Week 21 (con't)

Activities: (con't)

3. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

Life Science

Alcoholics Anonymous

Focus:

Function of Alcoholics Anonymous

Developmental Objectives:

To provide the student with observational experience with a supporting service organization devoted to self-help in curing a social-medical illness.

Behavioral Objectives:

1. The student will be able to describe the purpose of the organization.
2. The student will be able to identify services available to the members through the organization.
3. The student will be able to identify the response of the member and his family to the meeting.

Student Preparation:

1. Review history and function of Alcoholics Anonymous.
2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should attend a local meeting of AA.
2. The student should answer the following questions:
    a. Where did the meeting take place?
    b. How many people were present?
    c. How would you describe those attending?'
    d. What were the events of the meeting, in chronological order?
    e. How were you accepted by those present? Give examples of your interaction with others?
    f. What was the general feeling, tone of the meeting?
    g. How did you feel about this experience?
        a. before the meeting
        b. during the meeting
        c. after the meeting

Activities: (con't)

h. Would you recommend AA to anyone? If so why, and to whom? If not, why not?

3. Seminar following the experience.

4. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

Life Science

Drug Rehabilitation Group

Focus:

Function of drug rehabilitation group

Developmental Objectives:

To provide the student with observational experience with a supporting service organization devoted to self-help in curing a social-medical illness.

Behavioral Objectives:

1. The student will be able to state the purpose of the group.
2. The student will be able to identify services available to the members of the organization.
3. The student will be able to identify the response of the member to the meeting.
4. The student will be able to describe how he can aid the cause.

Student Preparation:

1. Read about drug misuse and drug rehabilitation.
2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a local drug rehabilitation center, either government or private.
2. The student should answer the following questions:
    - a. Where is the center located?
    - b. How many people were present?
    - c. How would you describe those attending?
    - d. What were the events of the meeting in chronological order?
    - e. How were you accepted by those present? Give examples of your interaction with others.
    - f. What was the general feeling, tone of the meeting?
    - g. How did you feel about this experience?
        - 1) before the meeting
        - 2) during the meeting
        - 3) after the meeting

Activities: (con't)

3. Seminar following the experience.
4. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

Life Science

Observation of Health Department

Focus:

The function of the Health Department

Developmental Objectives:

To provide the student with observational experience in goverment involvement in the health industry and specifically how it relates to their field of interest.

Behavioral Objectives:

1. The student will be able to describe the purpose of the Health Department.
2. The student will be able to describe what services are available to the public.
3. The student will be able to describe how he can aid the health department.
4. The student will be able to describe career opportunities in this field and the requirements for them.
5. The student will be able to describe the role of the health department as it relates to his professional field of interest.

Student Preparation:

1. Review the principles of public health.
2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit the local health department.
2. The student should seek answers to the following questions:
    a. What is the purpose of the Health Department?
    b. What services are available to the public? Do they cost the public anything?
    c. What can you do to aid the health department.
    d. What career opportunities are available in this field? What are the requirements for these careers?
3. The student, through his own research, should determine the role of the health department as it relates to his professional interest.
4. Seminar following the experience.
5. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

Week 24

Life Science

Mental Health

Focus:

The operation of a Mental Health Clinic

Developmental Objectives:

To provide the student with relevant application of the concepts covered in the academic program.

To provide the student with perspective of the health industry through observation of a clinic.

Behavioral Objectives:

1. The student will be able to describe the purpose of the mental health clinic.

d 2. The student will be able to describe the operation of the mental health clinic.

3. The student will be able to describe career opportunities in this field, and the requirements for each.

4. The student will be able to describe the role of the mental health clinic as it relates to his professional field of interest.

Student Preparation:

1. Review mental illness.

2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student will visit a local mental health clinic.

2. The student will seek answers to the following questions:

    a. What is the purpose of the mental health clinic?

    b. How is the clinic operated?

    c. What careers are available in this area and what are the requirements for these careers?

3. The student, through his own research, should determine the role of the mental health clinic as it relates to his professional field of interest.

4. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

Life Science

Pharmacist

Focus:

Role of the pharmacist

Developmental Objectives:

To provide the student with observational experience which will promote a perception of the health industry through the study of specific professions.

Behavioral Objectives:

1. The student will be able to describe the role of the pharmacist.
2. The student will be able to describe career opportunities and requirements for a pharmacist.
3. The student will be able to describe licensure requirements.

Student Preparation:

1. Review career opportunities in this field.
2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a pharmacist, prefereably located at a School of Pharmacy.
2. The student should seek answers to the following questions:
    a. What is the role of the pharmacist?
    b. What are the career opportunities (research, wholesale and retail) and requirements for a pharmacist?
    c. What are the licensure requirements for becoming a registered pharmacist?
3. The student, through his own research should determine the role of the pharmicist as it relates to his professional field of interest.
4. Seminar following experience.
5. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

Life Science

School of Biology or Biology Department of University

Focus:

Overview of the Department of Botany

Developmental Objectives:

To provide the student with relevant experience relating to the concepts covered in the academic program.

Behavioral Objectives:

1. The student will be able to describe the relationship of botany to the health fields.
2. The student will be able to describe the courses available and how they relate to the health fields.
3. The student will be able to describe the entrance requirements.
4. The student will be able to describe the career opportunities that relate to the health field.
5. The student will be able to describe the role of botany as it relates to his professional field of interest.

Student Preparation:

1. Read an article about botany.
2. Look at a college catalog for the entrance requirements to a department of botany and list what schools are available.
3. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit the biology department of a local college or university.
2. Describe the relationship of botany to the health fields in general and your professional field of interest in particular.
3. Describe the courses available in botany and how they relate to the health field.
4. Describe the entrance requirements for a school of botany.
5. Describe the career opportunities available in botany and how they relate to the health field.
6. Seminar following experience.
7. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

Life Science

Pharmaceutical Laboratory

Focus:

Roles of individuals involved with the manufacture of therapeutic agents

Developmental Objectives:

To provide the student with relevant application of the concepts covered in the academic program.

To provide the student with perspective of the health industry through observation of a pharmaceutical laboratory.

Behavioral Objectives:

1. The student will be able to describe the roles of individuals involved in the research, development, manufacture, and marketing of therapeutic agents.
2. The student will be able to describe the scientific processes utilized in the research, development, and manufacture of therapeutic agents.
3. The student will be able to describe the career opportunities and requirements for this field.
4. The student will be able to describe the role of the pharmaceutical laboratory as it relates to his professional field of interest.

Student Preparation:

1. Read about a pharmaceutical laboratory.
2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a pharaceutical laboratory.
2. The student should seek answers to the following questions:
    a. What individuals did you observe? What were their roles?
    b. What is the role of the FDA? Describe legislation that is related to drugs.
    c. What scientific processes did you see utilized?
    d. What career opportunities are available in this field?

Activities: (con't)

3. The student , through his own research, should determine the role of the pharmaceutical laboratory as it relates to his professional field of interest.

4. Seminar following the experience.

5. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

Life Science

Observation of Specific Professional or Technical Person

Focus:

Maintenance of an ongoing reocrding of observations

Developmental Objectives:

To introduce the student to the program, professional and personal requirements of his health program choice.

To promote student understanding and acceptance of his abilities, interests, and aptitudes in light of his career choice.

To provide the student with activity and experiences which allows identification to the profession he envisions entering.

Behavioral Objectives:

1. The student will describe and record the experiences of the day.
2. The student will compare the previous experiences to the day's experience.
3. The student will describe the role of the individual, and add additional knowledge about the individual's role as he proceeds through the period of observation.
4. The student will relate knowledge and principles from his educational program to his field of interest.

Student Preparation:

1. Review records of previous experiences. What did you learn? What would you like to learn on this experience? What information do you need?
2. Read at least one article per visit about your area of interest.
3. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should spend three quarters of the day with the professional in his field in interest.
2. Keep a record of your experiences during the day. Analyze your experience and determine what you have learned about the individual's role. What new information did you add this week? What was different from the last experience?
3. Describe instances that demonstarte application of knowledge which you have learned in class. What practical applications can you describe?

Activities: (con't)

4. Keep a written record of your findings. This record should be related to objectives, preparation and activities.

5. Share your findings in seminar after each visit.

Life Science

Observation of Specific Professional or Technical Person

Focus:

Maintenance of an ongoing recording of observations

Developmental Objectives:

To introduce the student to the program, professional and personal requirements of his health program choice.

To promote student understanding and acceptance of his abilities, interests, and aptitudes in light of his career choice.

To provide the student with activity and experience which allows identification to the profession he envisions entering.

Behavioral Objectives:

1. The student will describe and record the experiences of the day.
2. The student will compare the previous experiences to the day's experience.
3. The student will describe the role of the individual, and add additional knowledge about the individual's role as he proceeds through the period of observation.
4. The student will relate knowledge and principles from his educational program to his field of interest.

Student Preparation:

1. Review records of previous experiences. What did you learn? What would you like to learn on this experience? What information do you need?
2. Read at least one article per visit about your area of interest.
3. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should spend three quarters of the day with the professional in his field of interest.
2. Keep a record of your experiences during the day. Analyze your experience and determine what you have learned about the individual's role. What new information did you add this week? What was different from the last experience?
3. Describe instances that demonstrate application of knowledge which you have learned in class. What practical applications can you describe?

Activities: (con't)

4. Keep a written record of your findings. This record should be related to objectives, preparation and activities.
5. Share your findings in seminar after each visit.

Life Science

Hospital Dietician

Focus:

Role of the hospital dietician

Developmental Objectives:

To provide the student with relevant application of the concepts covered in the academic program.

To provide the student with observational experience which will promote a perception of the health industry through the study of specific professions.

Behavioral Objectives:

1. The student will be able to describe the role of the hospital dietician.
2. The student will be able to describe the hospital dietician's responsibility for the planning and preparation of the hospital.
3. The student will be able to describe the hospital dietician's role with the patient.
4. The student will be able to describe career opportunities and requirements for becoming a hospital dietician.
5. The student will be able to describe the certification requirements of the hospital dietician.
6. The student will be able to describe the role of the hospital dietician as it relates to his professional field of interest.

Student Preparation:

1. Review entrance requirements for medical dietetics programs and list the schools offering these courses.
2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should be split into small groups of 2 or 3 with each group visiting a dietician at different local hospitals.
2. The student should seek answers to the following questions:
   a. What is the role of the hospital dietician?
   b. What is the hospital dietician's role in planning and preparation of foods?
   c. How much patient contact does the hospital dietician have?

Activites: (con't)

- d. What are the career opportunities and requirements for becoming a hospital dietician?

- e. What are the certification requirements for the hospital dietician?

3. The student, through his own research, should determine the role of the hospital dietician as it relates to his professional field of interest.

4. Seminar following experience.

5. Submit a one page written report of your findings. This report should be related to objectives, preparation and activites.

Life Science

Campus Visitation Day

Focus:

The college or university of student's choice

Developmental Objectives:

To provide the student with on campus visitation experience to see where and how program requirements are to be carried out.

To provide the student with specific program requirements at the institution of higher education he would like to attend.

Behavioral Objectives:

1. The student will be able to describe the specific entrnace requirements of the college or university.
2. The student will be able to describe the program at the college or university.
3. The student will be able to describe the financial requirements and sources of aid at the college or university.
4. The student will be able to defend his choice of college or university as it relates to his professional field of interest.

Student Preparation:

1. Review the catalogue of the college or university.
2. Outline or list the courses you have taken.
3. Outline or list specific information you wish to gain from this experience.

Activities:

1. The student should visit the college or university of his choice.
2. The student should seek answers to the following questions:
    a. What are the entrance requirements?
    b. What are the possibilities for advanced placement?
    c. What financial aid is available?
    d. What are the requirements of the program of interest?
3. Submit a one page written report in which you discuss the results of your campus visitation.

Notes:

1. Any time left during a field experience day should be devoted to individual study.

2. Weeks 4, 17, 20, 22, 26 and 29 have two or more suggested experiences. The students should be allowed to choose the experience they wish to pursue for the day. The students should not be expected to all choose the same experience, and in fact might be encouraged to spread out, thus broadening the total group exposure.

3. If a scheduled experience is not feasible in a particular area, an alternate experience should be arranged, or the day might be used for a professional observation experience (POE).

4. What the experience for the day involves the whole student group observing a specific professional, the students should be split into small groups of 2 or 3 and be sent to visit various different professionals in the area, so as not to swamp the individual professional and also to provide for a varied group experience.

Weeks 1, 2, & 3

Tentative Rotation of Students

Groups	Week 1	Week 2	Week 3
1, 2	Autopsy Room	Orthopedic Surgeon	Osteopathic Doctor
3, 4	Osteopathic Doctor	Autopsy Room	Orthopedic Surgeon
5, 6	Orthopedic Surgeon	Osteopathic Doctor	Autopsy Room

Students should break into groups of 2 or 3 and rotate through the various experiences.

2nd Year

Life Science

Osteopathic Doctor

Focus:

Role of the Osteopathic Doctor.

Developmental Objectives:

To provide the student with experience which will allow him to gain a perspective of the health industry through study of specific professions.

Behavioral Objectives:

1. The student will be able to describe the role of the Osteopathic Doctor.
2. The student will be able to describe the daily activities of an Osteopathic Doctor.
3. The student will be able to describe career opportunities and entrance requirements for becoming an Osteopathic Doctor.
4. The student will be able to describe licensure requirements.
5. The student will be able to describe the role of the Osteopathic Doctor as it relates to his professional field of interest.

Student Preparation:

1. Review entrance requirements for school of Osteopathic Doctors.
2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a local Osteopathic Doctor or Osteopathic hospital.
2. The student should seek answers to the following questions:
    a. What is the role of an osteopathic doctor?
    b. What are the career opportunities, entrance requirements, and licensure requirements for Doctors of Osteopathy?
    c. How does the practice of osteopathic medicine differ from other forms of medical practice?
3. The student through his own research, should determine the role of osteopathic medicine as it is related to his professional field of interest.
4. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

2nd Year

Life Science

Autopsy Room (Morgue)

Focus:

Gross anatomy and the role of the pathologist in the autopsy room.

Developmental Objectives:

To provide the student with relevant applications of the concepts covered in the academic program.

Behavioral Objectives:

1. The student will be able to describe the gross anatomy of the human body.
2. The student will be able to describe the autopsy procedure.
3. The student will be able to describe the usual role of the pathologist in an autopsy and the significance of the result of an autopsy.
4. The student will be able to describe career opportunities in this field and the requirements for them.

Student Preparation:

1. Review the literature on autopsy procedures.
2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The students should visit a local autopsy room.
2. The students should seek answers to the following questions:
   a. What are the legal aspects of the result of an autopsy?
   b. What is the pathologist's role in an autopsy room?
   c. What careers are available in this area, and what are the requirements for them?
3. The student should submit a one page written report of his findings. This report should be related to the objective, preparation, and activities.

2nd Year

Life Science

Orthopedic Surgeon

Focus:

Role of the Orthopedic Surgeon

Developmental Objectives:

To provide the student with experience which will allow his to gain a perspective of the health industry through study of specific professions.

Behavioral Objectives:

1. The student will be able to describe the role of the Orthopedic Surgeon.
2. The student will be able to describe the daily activities of an Orthopedic Surgeon.
3. The student will be able to describe career opportunities and entrance requirements for becoming an Orthopedic Surgeon.
4. The student will be able to describe licensure requirements.
5. The student will be able to describe the role of the Orthopedic Surgeon as it relates to his professional field of interest.

Student Preparation:

1. Review professional entrance requirements for orthopedic surgery.
2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a local Orthopedic Doctor and Orthopedic hospital.
2. The student should seek answers to the following questions:
    a. What is the role of an orthopedic surgeon?
    b. What are the career opportunities, entrance requirements, and licensure requirements for Doctors of Orthopedic?
    c. How does the practice of orthopedic medicine differ from other forms of medical practice?
3. The student, through his own research, should determine the role of orthopedic medicine as it is related to his professional field of interes
4. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

2nd Year

Life Science

Artificial Limb Factory

Focus:

Role of the limb maker and designer

Developmental Objectives:

To provide the student relevant application of the concepts covered in the academic program.

To provide the student with perspective of the health industry through observation of an artificial limb factory.

Behavioral Objectives:

1. The student will be able to describe the role of limb maker with the patient requiring an artificial limb.
2. The student will be able to describe the methods the limb makers uses in making fitting an artificial limb.
3. The student will be able to describe the career opportunities and requirements for becoming a limb maker.

Student Preparation:

1. Review the literature on prosthetic devices.
2. Review the physical principles of lever and torques.
3. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should view a film on artificial limbs and/or visit an artificial limb factory.
2. The student should seek answers to the following questions:
   a. What is the role of a limb maker?
   b. How does the limb maker relate to the patient being fitted for a limb?
   c. What are the career opportunities and requirements for becoming a limb maker or designer?
3. The student should submit a one page written report of his findings. This report should be related to objectives, preparation and activities.

2nd Year

Life Science

Electromyogram

Focus:

Significance of EMG

Developmental Objectives:

To provide the student with relevant applications of the concepts covered in the academic program.

Behavioral Objectives:

1. The student will be able to describe the principles of the EMG.
2. The student will be able to describe the significance of the results of an EMG.

Student Preparation:

1. Review the literature on disorders of muscular system.
2. Review the literature on contraction of the skeletal muscles.
3. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a local hospital or clinic and observe the EMG procedure.
2. The student should seek answers to the following questions:
   a. What are the principles of the EMG?
   b. What is the significance of the results of an EMG?
   c. Who usually administers the EMG?
3. The student should submit a one page written report of his findings. This report should be related to objectives, preparation and activities.

2nd Year

Life Science

Doctor of Physical Medicine

Focus:

The role of Physiatrist

Developmental Objectives:

To provide the student with experience which will allow him to gain a perspective of the health industry through study of specific professions.

Behavioral Objectives:

1. The student will be able to describe the role of physiatrist.
2. The student will be able to describe the daily activities of a physiatrist.
3. The student will be able to describe career opportunities and entrance requirements for becoming physiatrist.
4. The student will be able to describe the licensure requirements.
5. The student will be able to describe the role of the physiatrist as it relates to his professional field of interest.

Student Preparation:

1. Review entrance requirements for school of physical medicine.
2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a local physiatrist.
2. The student should seek answers to the following questions:
   a. What is the role of physiatrist?
   b. What are the career opportunities, entrance requirements and licensure requirements for the physiatrist?
3. The student, through his own research, should determine the role of physical medicine as it is related to his professional field of interest.
4. The student should submit a one page written report of his findings. This report should be related to objectives, preparation and activities.

2nd Year

Life Science

Physical Therapy & The Physical Therapist

Focus:

Function of physical therapy department & physical therapist

Developmental Objectives:

To provide the student wil experience which will allow him to gain a perspective of the health industry though study of specific professions.

Behavioral Objectives:

1. The student will be able to describe the role of physical therapist.
2. The student will be able to describe the function of the department.
3. The student will be able to describe the daily activities of a Physical Therapist.
4. The student will be able to describe career opportunities and requirements for becoming a physical therapist.
5. The student will be able to describe the role of the Physical Therapist as it relates to his professional field of interest.

Student Preparation:

1. Review the literature on physical therapy.
2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit the physical therapy department of a local hospital.
2. The student should seek answers to the following questions:
    a. What is the role of the physical therapist?
    b. What are the career opportunities, entrance requirements, and licensure requirements for physical therapists?
    c. How does the practice of physical therapy differ from other forms of medical practice?
3. The student, through his own research, should determine the role of physical therapy as it is related to his professional field of interest.
4. The student should submit a one page written report of his findings. This report should be related to objectives, preparation and activities.

2nd Year

Life Science

Muscular Dystrophy Foundation

Focus:

Function of Muscular Dystrophy Foundation

Developmental Objectives:

To provide the student with a perspective of the health industry by observing an organization devoted to a single health problem.

Behavioral Objectives:

1. The student will be able to describe the function of Muscular Dystrophy Foundation.
2. The student will be able to describe the services available to the public.
3. The student will be able to describe the current research on muscular dystrophy.

Student Preparation:

1. Review the literature on muscular dystrophy.
2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a local office of the Muscular Dystrophy Foundation.
2. The student should seek answers to the following questions:
    a. What are the services available?
    b. What are the current research?
    c. What are the functions of the Muscular Dystrophy Foundation?
3. The student, through his own research, should determine the role of muscular dystrophy as it is related to his professional field of interest.
4. The student should submit a one page written report of his findings. This report should be related to objectives, preparation and activities.

2nd Year

Life Science

Gastro Intestinal Unit

Focus:

Observation of GI Unit

Developmental Objectives:

To provide the student with relevant applications of the concepts covered in the academic program.

Behavioral Objectives:

1. The student will be able to describe the function of the GI unit.
2. The student will be able to describe the significance of the procedures carried out.
3. The student will be able to describe the equipment utilized for diagnostic purposes.

Student Preparation:

1. Review the literature on disorders of digestive system.
2. Review the literature on fiber optics.
3. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit the GI unit in a local hospital.
2. The student should seek answers to the following questions:
   a. What is the function of the GI unit?
   b. What is the significance of the procedures observed?
   c. What equipment is used in the GI unit?
3. The student, through his own research, should determine the role of the gastro intestinal unit as it is related to his professional field of interest.
4. The student should submit a one page written report of his findings. This report should be related to objectives, preparation and activities.

2nd Year

Life Science

Heart Station

Focus:

Function of the heart station and the role of the technician.

Developmental Objectives:

To provide the student with relevant applications of the concepts covered in the academic program.

Behavioral Objectives;

1. The student will be able to describe the function of the heart station and the role of the technician.
2. The student will be able to describe the significance of the results of the examination.
3. The student will be able to describe career opportunities and requirements for becoming a heart station technician.

Student Preparation:

1. Review the literature on electrostatics as it applies to the ECG.
2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit the heart station in a local hospital.
2. The student should seek answers to the following questions:
    a. What is the function of the heart station and the role of the technician?
    b. What are the career opportunities and requirements for becoming a technician?
3. The student, through his own research, should determine the role of the heart station as it is related to his professional field of interest.
4. The student should submit a one page written report of his findings. This report should be related to objectives, preparation and activities.

2nd Year

Life Science

American Heart Association

Focus:

Function of the American Heart Association

Developmental Objectives:

To provide the student with a perspective of the health industry by observing an organization devoted to a single health problem.

Behavioral Objectives:

1. The student will be able to describe financial resources, research projects, and media resources of the American Heart Association.
2. The student will be able to describe the services offered by the American Heart Association.
3. The student will be able to determine who is eligible to receive services form American Heart Association.
4. The student will be able to determine his role in aiding the American Heart Association.
5. The student will be able to identify career opportunities in this field and the requirements for them.

Student Preparation:

1. Collect information about the American Heart Association and its purpose
2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student shuuld visit a local office of the American Heart Association.
2. The student should seek answers to the following questions:
    a. What are the sources of funds for the American Heart Association?
    b. What types of research projects are being pursued?
    c. What media resources are available?
    d. What types of aids are offered to the heart patient and who are the recipients of aid?
3. The student, through his own research, should determine therole of the heart association as it is related to his professional field of interest.

American Heart Association (con't)

Activities:

4. The student should submit a one page written report of his findings. This report should be related to objectives, preparation and activities.

2nd Year

Life Science

Geriatric Center

Focus:

The functions of the Geriatric Center

Developmental Objectives:

To provide the student with a perspective of the health industry by observing an organization devoted to a single health problem.

Behavioral Objectives:

1. The student will be able to describe the functions of the Geriatric Center.
2. The student will be able to describe the problem unique to the aging process.
3. The student will be able to describe who is admitted to the geriatric center and what benefits are available at the center.
4. The student will be able to describe how geriatric care has progressed in the last decade.
5. The student will be able to describe career opportunities in this field and the requirements for them.

Student Preparation:

1. Read about a geriatric center.
2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a local geriatric center.
2. The student should seek answers to the following questions:
   a. What is the function of the geriatric center?
   b. What are the problems unique to aging and geriatric care?
   c. Who is admitted to geriatric center? Are there requirements for admission?
   d. What changes have occurred in geriatric care over the past decade?
   e. What are the career opportunities in this field and what are the requirements for them?

Geriatric Center (con't)

Activities:

3. The student, through his own research, should determine the role of the geriatric center as it is related to his professional field of interest.

4. The student should submit a one page written report of his findings. This report should be related to objectives, preparation and activities.

2nd Year

Life Science

Jobst Institute (East Toledo)

Focus:

Function of Jobst Institute and its products.

Developmental Objectives:

To provide the student with a perspective of the health industry by observing an organization devoted to a single health problem.

Behavioral Objectives:

1. The student will be able to describe the function of Jobst Institute.
2. The student will be able to describe the procedure for constructing a jobst stocking.
3. The student will be able to describe the products and the uses of each.
4. The student will be able to describe the problems of the person who receives the stocking.
5. The student will be able to describe the career opportunities and the requirements in this field.

Student Preparation:

1. Review the principles of physics - pressure.
2. Review the circulatory system.
3. Review the literature on varicosities.
4. Review blood pressure.
5. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should seek answers to the following questions:
    a. What is the function of Jobst Institute?
    b. How is a Jobst Stocking constructed?
    c. What are the products and how is each one used?
    d. What are the type of problems of the person who is the receipient of a Jobst Stocking?
    e. What are the career opportunities in this field and the requirements for employment in this field?

Jobst Institute (con't)

Activities: (con't)

2. The student, through his own research, should determine the role of the Jobst Institute as it is related to his professional field of interest.

3. The student should submit a one page written report of his findings. This report should be related to objectives, preparation and activities.

2nd Year

Life Science

Cardiologist

(Vascular Surgeon)

Focus:

Role of the cardiologist

Developmental Objectives:

To provide the student with experience which will allow him to gain a perspective of the health industry through study of specific professions.

Behavioral Objectives:

1. The student will be able to describe the role of the cardiologist.
2. The student will be able to describe the career opportunities in this field and the requirements for this field.
3. The student will be able to describe the licensure requirements of the cardiologist.

Student Preparation:

1. Read about the cardiologist.
2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a local cardiologist.
2. The student should seek answers to the following questions:
    a. What is the role of the cardiologist?
    b. What career opportunities are available in this field and what are the requirements of them?
    c. Is licensure required in this field? Explain your answer.
3. The student, through his own research, should determine the role of a cardiologist as it is related to his professional field of interest.
4. The student should submit a one page written report of his findings. This report should be related to objectives

2nd Year

Life Science

Inhalation and Respiratory Therapy
(Includes Pulmonary Functions)

Focus:

Function of Inhalation (Respiratory) Therapy and the role of the Inhalation Therapist

Developmental Objectives:

To provide the student with experience which will allow him to gain a perspective of the health industry through study of specific professions.

Behavioral Objectives:

1. The student will be able to describe the function of inhalation therapy.
2. The student will be able to describe the role of the inhalation therapist.
3. The student will be able to describe the methods utilized in this therapy and the significance of these methods.
4. The student will be able to describe the career opportunities in this field and the requirements for them.
5. The student will be able to describe the licensure requirements.

Student Preparation:

1. Review the anatomy and physiology of respiratory system.
2. Review the gas laws from physics.
3. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit the inhalation therapy department in a local hospital.
2. The student should seek answers to the following questions:
   a. What is the function of inhalation therapy?
   b. What is the role of the inhalation therapist? What does he do?
   c. What are the methods used in inhalation therapy and what is the significance of each method?
   d. What career opportunities are available and what are the requirements for them?

Inhalation and Respiratory Therapy (con't)

Activities:

e. What are the licensure requirements for the inhalation therapist?

3. The student, through his own research, should determine the role of the inhalation therapist as it is related to his professional field of interest.

4. The student should submit a one page written report of his findings. This report should be related to objectives, preparation and activities.

2nd Year

Life Science

Multiple Sclerosis

Focus:

Function of Multiple Sclerosis Association

Developmental Objectives:

To provide the student with a perspective of the health industry by observing an organization devoted to a single health problem.

Behavioral Objectiv es:

1. The student will be able to describe the function of the Multiple Sclerosis Association.
2. The student will be able to describe the services available from the Multiple Sclerosis Association.
3. The student will be able to describe who receives aid from the Multiple Sclerosis Association.
4. The student will be able to describe career opportunities available in this field and the requirements for them.

Student Preparation:

1. Review the nervous system.
2. Review the literatrue on multiple sclerosis.
3. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a local office of the Multiple Sclerosis Foundation.
2. The student should seek answers to the following questions:
   a. What is the function of the Multiple Sclerosis Association?
   b. What services are available from the Multiple Sclerosis Association?
   c. Who receives aid from the Multiple Sclerosis Association?
   d. What are the career opportunities in this field and the requirements for them?
3. The student, through his own research, should determine the role of multiple sclerosis as it is related to his professional field of interest.
4. The student should submit a one page written report of his findings. This report should be related to objectives, preparation and activities.

2nd Year

Life Science

Cerebral Palsy

Focus:

Function of Cerebral Palsy Foundation

Developmental Objectives:

To provide the student with a perspective of the health industry by observing an organization devoted to a single health problem.

Behavioral Objectives:

1. The student will be able to describe the function of the Cerebral Palsy Foundation.
2. The student will be able to describe the services available from the Cerebral Palsy Foundation.
3. The student will be able to describe who receives aid from the Cerebral Palsy Foundation.
4. The student will be able to desribe career opportunities available in this field and the requirements for them.

Student Preparation:

1. Review the nervous system.
2. Review the literature on types of cerebral palsy.
3. Outlin e or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a local office of the Cerebral Palsy Foundation.
2. The student should seek answers to the following questions:
   a. What is the function of the Cerebral Palsy Foundation?
   b. What services are available from the Cerebral Palsy Foundation?
   c. Who receives aid from the Cerebral Palsy Foundation?
   d. What are the career opportunities in this field and the requirements for them?
3. The student, through his own research, should determine the role of cerebral palsy as it is related to his professional field of interest.
4. The student should submit a one page written report of his findings. This report should be related to objectives, preparation and activities.

2nd Year

Life Science

Extended Care Facility for Mentally Retarded

Focus:

Function of extended care facility for mentally retarded

Developmental Objectives:

To provide the student with a perspective of the health industry by observing an organization devoted to a single health problem.

Behavioral Objectives:

1. The student will be able to describe the function of the extended care facility.
2. The student will be able to describe the services and the benefits of the extended care facility.
3. The student will be able to describe the financial aids available to the extended care facility.
4. The student will be able to describe the environment and surroundings of the extended care facility.
5. The student will be able to describe the career opportunities available and the requirements for them.
6. The student will be able to describe the methods of care of the mentally retarded and the approach used with this type of disability.

Student Preparation:

1. Review the nervous system.
2. Review the literature on mental retardation.
3. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a local extended care facility.
2. The student should seek answers to the following questions:
    a. What is the function of this facility?
    b. What services and benefits are available at this facility, and to the mentally retarded?
    c. How does the facility receive financial aid?

Extended Care Facility for Mentally Retarded (con't)

Activities:

- d. Describe the environment and surroundings of the extended care faciltiy. How would this affect a mentally retarded person?

- e. What methods of treatment and care are employed for the mentally retarded individual?

- f. What are the career opportunities and the requirements for them?

3. The student, through his own research, should determine the role of the extended care facility as it is related to his professional field of interest.

4. The student should submit a one page written report of his findings. This report should be related to objectives, preparation and activities.

2nd Year

Life Science

Electroencephalogram

Focus:

Function of the Electroencephalogram

Developmental Objectives:

To provide the student with relevant applications of the concepts covered in the academic program.

Behavioral Objectives:

1. The student will be able to describe the function of the EMG.
2. The student will be able to describe the method by which the EEG is recorded.
3. The student will be able to describe the significance of the results of the EMG.
4. The student will be able to describe the career opportunities in this field and the requirements for them.

Student Preparation:

1. Review the nervous system.
2. Review electrostatics and bioelectric current.
3. Review the literature on epilepsy.
4. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a local hospital or clinic and observe the EMG procedure.
2. The student should seek answers to the following questions:
    a. What are the principles of the EMG?
    b. What is the significance of the results of an EMG?
    c. Who usually administers the EMG?
3. The student should submit a one page written report of his findings. This report should be related to objectives, preparation and activities.

Electroencephalogram (con't)

Activities:

a. What is the function of the electroencephalogram?

b. What is the method by which the EMG is recorded?

c. What is the significance of the results of the EMG?

d. What career opportunities are available in this field and what are the requirements for them?

4. Submit a one page written report of your findings. This report should be realted to objectives, preparation and activities.

2nd Year

Life Science

Psychiatric Unit State Hospital

Focus:

Function of the psychiatric unit and the role of the people involved in the care of the patient who is having difficulty coping with stress.

Developmental Objectives:

To provide the student with experience which will allow him to gain a perspective of the health industry through study of specific professions.

Behavioral Objectives:

1. The student will be able to describe the function of the psychiatric unit, the environment and the type of care the individual who is having difficulty coping with stress receives.

2. The student will be able to identify members of the team that is caring for the person having difficulty coping with stress and the role of each member.

3. The student will be able to describe the rehabilitation programs available to the individual who is having difficulty coping with stress.

4. The student will be able to describe the services available to the individual who is having difficulty coping with stress.

5. The student will be able to describe the career opportunities available in this field and the requirements for them.

Student Preparation:

1. Review the nervous system.

2. Review mental health principles.

3. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a local Psychiatric Doctor or Psychiatric hospital.

2. The student should seek answers to the following questions:

   a. What is the function of the psychiatric unit, the environment and type of care the infividual who is having difficulty coping with stress receives?

Psychiatric Unit State Hospital (con't)

Activities:

b. Who are the members of the members of the team caring for the individual who is having difficulty coping with stress? Describe each member's role.

c. What rehabilitation programs are available for the individual who is having difficulty coping with stress?

d. What services are available to this individual?

e. What are the career opportunities and the requirements for them?

3. The student through his own research, should determine the role of Psychiatric medicine as it is related to his professional field of interest.

4. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

2nd Year

Life Science

Epilepsy Foundation

Focus:

Function of the Epilepsy Foundation

Developmental Objectives:

To provide the student with a perspective of the health industry by observing an organization devoted to a single health problem.

Behavioral Objectives:

1. The student will be able to describe the function of the Epilepsy Foundation.
2. The student will be able to describe the services available from the Epilepsy Foundation.
3. The student will be able to describe who receives aid from the Epilepsy Foundation.
4. The student will be able to describe career opportunities available in this field and the requirements for them.

Student Preparation:

1. Review the nervous system.
2. Review the literature on types of epilepsy.
3. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a local office of the Epilepsy Foundation.
2. The student should seek answers to the following questions:
    a. What is the function of the Epilepsy Foundation?
    b. What services are available from the Epilepsy Foundation?
    c. Who receives aid from the Epilepsy Foundation?
    d. What career opportunities are available in this field and what are the requirements for them?
3. The student through his own research, should determine the role of Epilepsy medicine as it is related to his professional field of interest.
4. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

2nd Year

Life Science

Mental Hygiene Clinic

Focus:

Function of the Mental Hygiene Clinic

Developmental Objectives:

To provide the student with a perspective of the health industry by observing an organization devoted to a single health problem.

Behavioral Objectives:

1. The student will be able to describe the purpose of the clinic.
2. The student will be able to identify the services available through the clinic.
3. The student will be able to identify members of the health team.
4. The student will be able to describe the role of each member of the health team.

Student Preparation:

1. Review the nervous system.
2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a local mental hygiene clinic.
2. The student should seek answers to the following questions:
    a. What is the purpose of the clinic?
    b. Who can attend the clinic?
    c. Who are the members of the health team?
    d. What are the career opportunities available and describe the requirements for them?
3. The student through his own research, should determine the role of mental hygiene as it is related to his professional field of interest.
4. The student should submit a one page written report of his findings. This report should be related to objectives, preparation and activites.

2nd Year

Life Science

Opthalmologist

Focus:

Function and role of the opthalmologist.

Developmental Objectives:

To provide the student with a perspective of the health industry by observing an organization devoted to a single health problem.

Behavioral Objectives:

1. The student will be able to describe the role of the opthalmologist.
2. The student will be able to describe the significance of the results of the examination done by the opthalmologist.
3. The student will be able to describe the equipment the opthalmologist uses.
4. The student will be able to describe the career opportunities and the requirements for them.

Student Preparation:

1. Review the anatomy and physiology of the eye.
2. Review the principles of optics.
3. Review the literature on eye disorders and visual defects.
4. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a local opthalmologist.
    a. What is the role of the [illegible]almologist?
2. The student should seek answers to the following questions:
    a. What is the purpose of the clinic?
    b. What equipment does the opthalmologist use?
    c. What significance do the results of his examinations have?
    d. What are the career opportunities available and describe the requirements for them?

Opthalmologist (con't)

Activities:

3. The student through his own research, should determine the role of the opthalmologist as it is related to his professional field of interest.

4. The student should submit a one page written report of his findings. This report should be related to objectives, preparation and activites.

2nd Year

Life Science

Optometrist

Focus:

Function and role of the oprometrist

Developmental Objectives:

To provide the student with experience which will allow him to gain a perspective of the health industry through study of specific professions.

Behavioral Objectives:

1. The student will be able to describe the role of the optometrist.
2. The student will be able to describe the significance of the results of the examination done by the optometrist.
3. The student will be able to describe the equipment the optometrist uses.
4. The student will be able to describe the career opportunities and the requirements for them.

Student Preparation:

1. Review the anatomy and physiology of the eye.
2. Review the principle of optics.
3. Review the literature on visual defects.
4. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a local optometrist.
   a. What is the role of the optometrist?
2. The student should seek answers to the following questions:
   a. What is the purpose of the clinic?
   b. What equipment does the optometrist use?
   c. What significance do the results of his examinations have?
   d. What are the career opportunities available and describe the requirements for them?

Optometrist

Activities:

3. The student through his own research, should determine the role of the optometrist as it is related to his professional field of interest.

4. The student should submit a one page written report of his findings. This report should be related to objectives, preparation and activities.

2nd Year

Life Science

Eye Bank

Focus:

Function of the eye bank.

Developmental Objectives:

To provide the student with a perspective of the health industry by observing an organization devoted to a single health problem.

Behavioral Objectives:

1. The student will be able to describe the function and purpose of the eye bank.
2. The student will be able to describe the services available through the eye bank.
3. The student will be able to describe the source of supply.
4. The student will be able to describe the financial support a available to eye bank.
5. The student will be able to describe who the recipients are.
6. The student will be able to describe current research on the eye.
7. The student will be able to describe the career opportunities available in this field and the requirements for them.

Student Preparation:

1. Review the anatomy and phsiology of the eye.
2. Review the literature on eye transplants.
3. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a local Eye Bank.
2. The student should seek answers to the following questions:
   a. What is the function of the eye bank?
   b. What is the source of supply?

Eye Bank

Activities:

c. What services are available through the eye bank?

d. What type of financial support does the eye bank receive?

e. Who are the recipients of eyes?

f. What current research is being done on the eye?

g. What are the career opportunities available in this field and the requirements for them?

3. The student through his own research, should determine the role of the eye bank as it is related to his professional field of interest.

4. Submit a one page written report of your findings. This report should be related to objectives, preparation and activities.

2nd Year

Life SCience

Otologist

Focus:

Function and role of the otologist

Developmental Objectives:

To provide the student with experience which will allow him to gain a perspective of the health industry through study of specific professions.

Behavioral Objectives:

1. The student will beable to describe the role of the otologist.
2. The student will be able to describe the significance of the results of the examination done by the otologist.
3. The student will be able to describe the equipment the otologist uses.
4. The student will be able to describe the career opportunities and the requirements for them.

Student Preparation:

1. Review the anatomy and physiology of the ear.
2. Review the principles of sound production, propogation and detection.
3. Review the literature on ear disorders and defects.
4. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a local otologist.
   a. What is the role of the otologist?
2. The student should seek answers to the following questions:
   a. What is the purpose of the clinic?
   b. What equipment does the otologist use?
   c. What significance do the results of his examinations have?
   d. What are the career opportunities available and describe the requirements for them?

Otologist

Activities:

3. The student through his own research, should determine the role of the otologist as it is related to his professional field of interest.

4. The student should submit a one page written report of his findings. This report should be realted to objectives, preparation and activities.

2nd Year

Life Science

Speech-Hearing Therapy

Focus:

The role of the Speech-Hearing Therapist

Developmental Objectives:

To provide the student with experience which will allow him to gain a perspective of the health industry through study of specific professions.

Behavioral Objectives:

1. The student will be able to describe the role of the speech and hearing therapist.
2. The student will be able to describe the function of speech and hearing therapy.
3. The student will be able to describe the methods of testing and the significance of the results of the testing for speech and hearing therapy.
4. The student will be able to describe the services available through the speech and hearing clinic.
5. The student will be able to describe the career opportunities and the requirements for them.

Student Preparation:

1. Review the anatomy and physiology of the ear and organ of phonation.
2. Review the literature on disorders of the ear and organ of phonation.
3. Review the literature on hearing and speech defects.
4. Review the principles of sound production, propogation and detection.
5. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a local speech-hearing therapy doctor or speech-hearing therapy hospital.
2. The student should seek answers to the following questions:
   a. What is the role of a speech-hearing therapist?

Speech-Hearing Therapy

Activities:

b. What is the function of speech and hearing therapy?

c. What are the methods of testing and the significance of the results of the testing for speech and hearing therapy?

d. What are the services available through the speech and hearing clinic?

e. What are the career opportunities and the requirements for them?

3. The student through his own research. should determine the role of the speech and hearing therapist as it is related to his professional field of interest.

4. Submit a one page written report of your findings. This report should be realted to objectives, preparation and activities.

2nd Year

Life Science

Kidney Foundation

Focus:

Function of the Kidney Foundation

Developmental Objectives:

To provide the student with a perspective of the health industry by observing an organization devoted to a single health problem.

Behavioral Objectives:

1. The student will be able to describe the function of the Kidney Foundation.
2. The student will be able to describe the services available from the Kidney Foundation.
3. The student will be able to describe who receives aid from the Kidney Foundation.
4. The student will be able to describe career opportunities available in this field and the requirements for them.

Student Preparation:

1. Review the excretory system.
2. Review the literature on kidney disorders.
3. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should vivit a local office of the Kidney Foundation.
2. The student should seek answers to the following questions:
    a. What is the function of the Kidney Foundation?
    b. What services are available from the Kidney Foundation?
    c. Who receives aid from the Kidney Foundation?
    d. What career opportunities are available in this field and what are the requirements for them?
3. The student, through his own research, should determine the role of the Kidney Foundation as it is related to his professional field of interest.

Activities:

4. The student should submit a one page written report of his findings. This report should be related to objectives, preparation and activities.

2nd Year

Life Science

Kidney Machine Dialysis Center

Focus:

Function of the Dialysis center and the role of the members of the health team

Developmental Objectives:

To provide the student with relevant applications of the concepts covered in the academic program.

Behavioral Objectives:

1. The student will be able to describe the function of the dialysis center.
2. The student will be able to describe the role of each member of the health team.
3. The student will be able to describe the principles of the dialysis machine.
4. The student will be able to describe the sources of financial support.
5. The student will be able to describe the home dialysis program.
6. The student will be able to describe the career opportunities available in this program and the requirements for them.

Student Preparation:

1. Review the excretory system.
2. Review the principles of bioninstrumentation.
3. Review the physiology of the kidney.
4. Review the literature on disorders of the kidney.
5. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit the dialysis center in a local hospital.
2. The student should seek the answers to the following questions:
    a. What is the function of the dialysis center?
    b. What is the role of each member of the health team?

Kidney Machine Dialysis Center

Activities:

c. What are the principles of the dialysis machine?

d. What are the sources of financial support?

e. What is the home dialysis program?

f. What career opportunities are available and what are the requirements for them?

3. The student, through his own research, should determine the role of the dialysis center as it is related to his professional field of interest.

4. The student should submit a one page written report of his findings. This report should be related to objectives, preparation and activities.

2nd Year

Life Science

Burn Unit

Focus:

Function of the Burn Unit and the role of the members of the health team

Developmental Objectives:

To provide the student with relevant applications of the concepts covered in the academic program.

Behavioral Objectives:

1. The student will be able to describe the function of the burn unit.
2. The student will be able to describe the roles of the members of the health team.
3. The student will be able to describe the environment and care of the patient.
4. The student will be able to describe the problems which are unique to the burn patient.
5. The student will be able to describe the services available to the burn patient.
6. The student will be able to describe current research on burns.
7. The student will be able to describe the career opportunities available in this field and the requirements for them.

Student Preparation:

1. Review the anatomy and physiology of the skin, fluids, and electrolytes, and the dynamics of circulation.
2. Review the literature on skin grafts.
3. Outline or list specific information you expect or would like to gain from this experience.

Activities;

1. The student should visit the burn unit in a local hospital.
2. The student should seek answers to the following questions:
    a. What is the function of the burn unit?
    b. What are the roles of the members of the health team?

Burn Unit

Activities:

c. What is unique about the environment and the care of the patient?

d. What problems are unique to the burn patient?

e. What services are available to the burn patient?

f. What current research is being done on burns?

g. What are the career opportunities available in this field and the requirements of them?

3. The student, through his own research, should determine the role of the burn unit as it is related to his progessional field of interest.

4. The student should submit a one page written report of his findings. This report should be related to objectives, preparation and activities.

2nd Year

Life Science

Endocrinology Clinic

Focus:

Function of endocrinology clinic and the roles of members of the health team

Developmental Objectives:

To provide the student with relevant applications of the concepts covered in the academic program.

Behavioral Objectives:

1. The student will be able to describe the function of the endocrinology clinic.
2. The student will be able to describe the roles of the member of the health team.
3. The student will be able to describe the methods utilized in the therapy and the significance of these methods.
4. The student will be able to describe current research in endocrinology.
5. The student will be able to describe the career opportunities in this field and the requirements for them.

Student Preparation:

1. Review the anatomy and physiology of the endocrine system.
2. Review the literature on disorders of the endocrine system.
3. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit the endocrinology clinic in a local hospital.
2. The student should seek answers to the following questions:
   a. What is the function of endorcinology clinic?
   b. What are the roles of the members of the health team?
   c. What methods of therapy are utilized and what is the significance of these methods?
   d. What current research is being done in endocrinology?
   e. What are the career opportunities in this field and the requirements for them?

Activities:

3. The student, through his own research, should determine the role of the endocrinology clinic as it is related to his professional field of interest.

4. The student should submit a one page written report of his findings. This report should be related to objectives, preparation and activities.

2nd Year

Life Science

Planned Parenthood

Focus:

Family Planning

Developmental Objectives:

To provide the student with a perspective of the health industry by observing an organization devoted to a single health problem.

Behavioral Objectives:

1. The student will be able to describe the purpose of Planned Parenthood.
2. The student will be able to describe the preparation of the client for counseling.
3. The student will be able to describe the types of counseling available to clients.
4. The student will be able to describe the clients reaction to counseling.
5. The student will be able to describe career opportunities and the requirements for them.

Student Preparation:

1. Review the anatomy and physiology of reproductive system.
2. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. Select one client and follow this client through the process at Planned Parenthood.

   Example of the process

   a. The client makes appointment (either in person or by phone)
   b. The client arrives at reception desk.
   c. The client may go to social intake.
   d. The client is taken to an interview office.
   e. A blood pressure, weight, urinalysis and hemoglobin is done.
   f. The client is then taken to a doctor's office.
   g. An examination is done.
   h. The client arrives at dispensary.
   i. The client returns to the receptionist's desk.

2. Write and submit to your instructor a one page report of your findings. The report should be related to objectives, preparation and activities.

2nd Year

Life Science

Gynecologist

Focus:

Role of the Gynecologist

Developmental Objectives:

To provide the student with relevant applications of the concepts covered in the academic program.

Behavioral Objectives:

1. The student will be able to describe the role of the gynecologist.
2. The student will be able to describe the career opportunities in this field and the requirements for them.

Student Preparation:

1. Review the anatomy and physiology of the reproductive system.
2. Review the literature on disorders of the reproductive system.
3. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a local Gynecologist Doctor.
2. The student should seek answers to the following questions:
   a. What is the role of the gynecologist?
   b. What career opportunities are available and the requirements for them?
3. The student, through his own research, should determine the role of the Gynecologist as it is related to his professional field of interest.
4. The student should submit a one page written report of his findings. This report should be related to objectives, preparation and activities.

2nd Year

Life Science

Lost-Chord Club

Focus:

Rehabilitation of people who have had laryngectomies

Developmental Objectives:

To provide the student with a perspective of the health industry by observing an organization devoted to a single health problem.

Behavioral Objectives:

1. The student will be able to describe the function of the lost chord club.
2. The student will be able to describe the method used to teach speech, and the method by which the person speaks.
3. The student will be able to describe the services and benefits available through the lost chord club.

Student Preparation:

1. Review the anatomy and physiology of the larynx.
2. Review the literature on esophageal speech.
3. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a local office of the Lost-Chord Club.
2. The student should seek answers to the following questions:
    a. What is the function of the lost chord club?
    b. What method is used to teach speech, and the method the person uses to speak?
    c. What services and benefits are available to the person who has had a laryngestomy?
3. The student, through his own research, should determine the role of the lost chord club as it is related to his professional field of interest.
4. The student should submit a one page written report of his findings. This report should be related to objectives, preparation and activities.

2nd Year

Life Science

Heart Strokers

Focus:

Function of the Strokers

Developmental Objectives:

To provide the student with a perspective of the health industry by observing an organization devoted to a single health problem.

Behavioral Objectives:

1. The student will be able to describe the function of the Strokers.
2. The student will be able to describe the services and benefits available through the heart strokers.

Student Preparation:

1. Review the anatomy and physiology of the circulatory system.
2. Review the causes of strokes.
3. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a local office of the Heart Strokers.
2. The student should seek answers to the following questions:
    a. What is the function of the strokers?
    b. What services and benefits are available to the strokers?
3. The student, through his own research, should determine the role of the heart strokers as it is related to his professional field of interest.
4. The student should submit a one page written report of his findings. This report should be related to objectives, preparation, and findings.

2nd Year

Life Science

Colostomy Club

Focus:

Function of the Colostomy Club

Developmental Objectives:

To provide the student wiht a perspective of the health industry by observing an organization devoted to a single health problem.

Behavioral Objectives:

1. The student will be able to describe the function of the colostomy club.
2. The student will be able to describe the services and benefits available through the colostomy club.

Student Preparation:

1. Review the anatomy and physiology of the large intestine.
2. Review the literature on gastrointestinal disorders.
3. Outline or list specific information you expect or would like to gain from this experience.

Activities:

1. The student should visit a local office of the Colostomy Club.
2. The student should seek answers to the following questions:
   a. What is the function of the colostomy club?
   b. What services and benefits are available to the members of the colostomy club?
3. The student, through his own research, should determine the role of the colostomy club as it is related to his professional field of interest.
4. The student should submit a one page written report of his findings. This report should be related to objectives, preparation and activities.

Pre-Post Secondary Health Career Program
1st Year - Biology

Unit I Basic Concepts

- A. Branches of Science
- B. History of Science
- C. History of Medicine
- D. Organization of the Human Body (Terminology)
- E. Health Careers

Unit II Microscope

- A. Light Microscope
  - 1. Construction of Microscope
  - 2. Care of Microscope
  - 3. How to use Microscope
    - a. Change objective - include focus
    - b. Magnification
    - c. Oil immersion
    - d. Learn to see with one eye
    - e. How to draw microscope objects
    - f. Examining prepared slides
- B. Microphotography
  - 1. Lighting
  - 2. Apparatus used
- C. Electron Microscope
  - 1. Construction of
  - 2. Lens system
  - 3. Viewing and Recording of the image
  - 4. Methods of focusing

Unit III Physiology of the Cell

- A. Anatomy of the cell
- B. Organization of the Cell Membrane
- C. Membrane Transports - Exchange of Materials
- D. Organization of Cellular Function
  - 1. Nucleus
  - 2. Mitochondria
  - 3. Golgi Apparatus
  - 4. Lysosomes
  - 5. Ribosome
  - 6. Endoplasmic Reticulum
- E. Mitosis - Meiosis
- F. Control of Cell Growth
  - 1. Malignent
  - 2. Benign
- G. Cells and Aging
- H. Cellular Metabolism
  - 1. Energy Metabolism
  - 2. Intra-cellular Oxidation

Unit IV Histology

- A. Classification of Tissues and Membranes
    - 1. Epithelial
    - 2. Muscle
    - 3. Connective
    - 4. Adipose
    - 5. Nervous
    - 6. Mucous Membrane
    - 7. Serous Membrane
    - 8. Synovial Membrane
    - 9. Cutaneous Membrane
- B. Microtome Technique
    - 1. Fixing
    - 2. Paraffin Infiltration
    - 3. Embedding in Paraffin
    - 4. Mounting and Trimming the Block
    - 5. Cutting with microtome
    - 6. Handling of Sections
- C. Examination of Preparation

Unit V Heredity and Evolution

- A. Theories of Evolution
    - 1. Views on evolution before Darwin
    - 2. Darwins' Theory of Evolution
    - 3. Other theories
    - 4. Adaptation and Selection
- B. Origin of Life on Earth
    - 1. Spontaneous Generation
    - 2. Biogenesis
- C. Genetics
    - 1. DNA-RNA
    - 2. Protein Synthesis
    - 3. Genes in Action
        - a. Multiple Genes
        - b. Multiple Alleles
        - c. Genes and Population
    - 4. Chromosomes
        - a. Chromosome Theory of Heredity
        - b. Sex Chromosomes
        - c. Mapping Chromosomes
        - d. Chromosome Aberration
        - e. Mutations
    - 5. Genetic Disease
    - 6. Human Heredity
        - a. Heredity and Envitonment
            - 1) Effects of Radiation
        - b. Heredity Patterns in Man
- D. Probability and Genetics

Unit VI Microbiology

- A. Bacteria
    - 1. Introduction
        - a. Nomenclature
        - b. Classification

- 2. Characteristics of Bacteria
  - a. Anatomy of Bacteria
  - b. Culination of Bacteria
- B. Other Microorganisms
  - 1. Molds
  - 2. Yeast
  - 3. Virus
  - 4. Protozoa
  - 5. Algae
  - 6. Rickettsiae
- C. Microorganisms and Related Disease
- D. Applied Microbiology
  - 1. Microbiology of Water
  - 2. Microbiology of Sewage
  - 3. Microbiology of Air
  - 4. Microbiology of Milk
  - 5. Microbiology of Soil
  - 6. Microbiology of Foods
  - 7. Microbiology used in Industry
    - a. Bacteria
    - b. Yeast
    - c. Molds

Unit VII Immunology

- A. Infection and Immunity
  - 1. Body Defenses against Infection
  - 2. Antibody Formation
  - 3. Antigens
  - 4. Antibody - Antigen Reactions
  - 5. Antibiotics
- B. Blood groups
  - 1. Typing
    - a. ABO Compatibility
    - b. Rh
  - 2. Transfusion
- C. Organ and Tissue Transplants

Unit VIII Health

- A. Tobacco
  - 1. Substances in Tobacco
  - 2. Chemistry of Tobacco
  - 3. Effects of Tobacco on Man
  - 4. Related Disease
- B. Alcohol
  - 1. Chemistry of Alcohol
  - 2. Misuse of Alcohol
  - 3. Related Diseases
- C. Drugs
  - 1. Types and Chemistry of
    - a. Narcotics
    - b. Sedatives and Tranquilizers
    - c. Stimulating
    - d. Mind - Affecting
  - 2. Addiction

    - 3. Use and misuse
- D. Epidemics
    - 1. Controlling
    - 2. World Consequences
    - 3. Prevention Medicine
- E. Public Health Services
    - 1. Health Agencies
    - 2. Health in Industry
    - 3. World Health Organization
- F. Mental Health
    - 1. Reacting to Stress
    - 2. Common Problems
- G. Environmental Health - Ecology
    - 1. Air
    - 2. Sound
    - 3. Water
    - 4. Waste Disposal
    - 5. Soil
    - 6. Population

Unit IX Plant Physiology

- A. Introduction
    - 1. Structure of Cell
    - 2. Function of Parts of Cell
- B. Water Relation
    - 1. Absorption and translocation of water
    - 2. Stomatal Mechanism
- C. Respiration and Ferementation
- D. Translocation of Sugar
- E. Photosynthesis
- F. Mineral Nutrition
- G. Nitrogen Merabolism
- H. Plant Growth Hormones
- I. Synthetic Growth Hormones

Unit X Metabolism

- A. Metabolism of Proteins
- B. Metabolism of Fats
- C. Metabolism of Carbohydrates
    - 1. Release of Energy from Glucose
- D. Metabolism of Water
- E. Metabolism of Minerals
- F. Metabolism of Nucleic Acids
- G. Caloric Value
- H. Rate of Metabolism
    - 1. Body temperature

Unit XI Nutrition
- A. Nutrients
    - 1. Proteins
    - 2. Carbohydrates
    - 3. Fats
    - 4. Vitamins
    - 5. Minerals

        - a. Water Soluble
        - b. Fat Soluble
- B. Basic 4 Food Groups
    - 1. Construct Normal Diet
    - 2. Ethnic Differences
- C. Dietary Problems

Unit XII Exobiology

- A. Extraterrestrial Life
- B. Temperature Problems in Space
- C. Radiation Problems in Space
- D. Acceleration Problems in Space
- E. Pressure Problems in Space
- F. Weightlessness Problems in Space
- G. Man's Behavior in Space

PRE-POST SECONDARY HEALTH CAREER PROGRAM

2nd Year - ANATOMY and PHYSIOLOGY

Unit I Osteology System

- A. Structure of Bone and Cartilage
- B. Ossification and Formation of Bone and Cartilage
- C. Types of Bones
- D. Sinuses
- E. Bone Markings
- F. Axial Skeleton
- G. Appendicular Skeleton
- H. Types of Joints
  - 1. Articulation - Movement
- I. Bone and Joint Disorders

Unit II Myology

- A. Structure of Muscle
- B. Chemistry of Muscle Contraction
  - 1. Types of Muscle Contraction
    - a. muscle response to different stimuli
  - 2. Myoneural Junction
  - 3. Effects of Muscle Exercise
- C. Classification of Skeletal Muscles
  - 1. Origin and insertion
- D. Muscle Disorders

Unit III Gastroenterology

- A. Anatomy and Physiology of digestive organs and glands
- B. Chemistry of Digestive
  - 1. Mouth
    - a. dental hygiene
    - b. development of teeth
  - 2. Mastication
    - a. salivary glands
    - b. enzymes
  - 3. Tongue
  - 4. Oropharynx
  - 5. Esophagus
  - 6. Stomach
    - a. gastric glands
    - b. movement of stomach
    - c. enzymes
  - 7. Small Intestine
    - a. enzymes
    - b. movement of intestine
    - c. absorption
  - 8. Large Intestine
  - 9. Other Organs
    - a. liver
    - b. gall bladder
    - c. panereas

C. Disorders of the Digestive System

Unit IV Circulatory

A. Hematology
  1. Composition of blood
  2. Bone Marrow
  3. Circulation of Blood
  4. Blood Clotting
B. Vascular System
  1. Anatomy and physiology of arteries and veins
  2. Capillaries
C. Lymphatic System
  1. Anatomy and physiology of lymphatic system
    a. tonsils
    b. spleen
D. Types of Circulation
  1. Portal
  2. Renal
  3. Systemic
  4. Pulmonary
  5. Coronary
  6. Cerebral
  7. Cutuneous
  8. Muscular
E. Heart
  1. Anatomy and Physiology
  2. Heart walls and cavities
  3. Cardiac Cycle
  4. Heart Beat
  5. Heart Sounds
  6. Bioelectric currents
  7. Electro cardiograms
F. Physiology of Circulation
  1. Blood Pressure
    a. measurement
  2. Pulse
  3. Blood Distribution
  4. Calculation Blood volume and velocity
G. Disorders of Circulatory System

Unit V Respiration

A. Anatomy and Physiology of Respiratory Organs
  1. Nasal cavities
  2. Nasopharynx
  3. Laryngopharynx
  4. Larynx
  5. Trachea
  6. Bronchii
  7. Lungs
  8. Thorax
B. Mechanism of Inspiration and Expiration
C. Capacity of the Lungs
  1. Calculation of physiology of dead space
D. Transport of gases by blood
E. Respiratory Control
F. Disorder of Respiratory System

Unit VI Neurology

A. Classification of neurons
B. Nerve impulse
C. Neural connection
   1. reflexes
   2. physiology of reflexes
D. Spinal Cord
   1. Spinal nerves
   2. Pathways of the cord
   3. Distribution of spinal plexus
   4. Cerebrospinal Fluid
E. Brain
   1. Anatomy and Physiology
      a. cerebellum
      b. cerebrum
      c. medulla
F. Cranial Nerves
G. Autonomic nervous system
   1. parasympathetic
   2. sympathetic
H. Disorders of the nervous system

Unit VII Eye

A. Anatomy of the eye
   1. coats of the eye
   2. muscles of the eye
   3. acessary structures
   4. fluid of the eye
B. Physics of vision
C. Chemistry of vision
D. Visual Path
   1. Reaction of retina
E. Visual Accuity
F. Visual Defects
Disorder or diseases of the eye

Unit VIII Ear

A. Anatomy of the Ear
   1. External Ear
   2. Middle Ear
   3. Inner Ear
B. Mechanism of Hearing
   1. Nature of Sound
   2. Auditory Sensation
C. Vestibular Function
D. Hearing Tests
E. Eustachian Tube
F. Hearing Disorders

Unit IX Excretory

A. Anatomy and Physiology of the Kidneys
B. Anatomy and Physiology of the Ureteus
C. Anatomy and Physiology of the Bladder
D. Anatomy and Physiology of the Urethua
E. Volume and Composition of Urine
F. Urine Formation
G. Urination
H. Physiology of Kidney Disease
I. Artificial Kidney
J. Renal Regulation of Water and Electrolytes
K. Disorders of Excretory System
L. Anatomy and Physiology of the Skin
  1. Accessory Organs
    a. hair
    b. nails
    c. glands
  2. Skin Disorders

Unit X Endocrinology

A. Anatomy and Physiology of Pituitary Glands
B. Anatomy and Physiology of Thyroid Glands
C. Anatomy and Physiology of Para-Thyroid Glands
D. Anatomy and Physiology of Adrenal Glands
E. Anatomy and Physiology of Pancreas
  1. Islets of Langerhans
  2. Diabetes Mellitus
  3. Diabetes and Heredity
  4. Insulin
  5. Insulin in the Blood
F. Anatomy and Physiology of Ovary
  1. Menstruation
G. Anatomy and Physiology of Testes
H. Digestive Hormones
I. Anatomy and Physiology of Pineal Glands
J. Anatomy and Physiology of Thymus
K. Disorders of the Endocrine System

Unit XI Reproductive

A. Anatomy and Physiology of Male and Female Reproductive Systems
B. Introduction to Embryology
  1. Fertilization
  2. Implantation
  3. Embryotic Membrane (Relation of Embryo to Uterus)
  4. Process of Cleavage and Formation of Germ Layers
  5. Early Development of Body Form
  6. Establishment of Organ Systems
  7. Fetal Circulation
  8. Development of Organ Systems
C. Birth Process
D. Disorders of Reproductive System

PRE-POST SECONDARY HEALTH CAREER PROGRAM

Year 1 - Biology

Unit I

Unit Title - Basic Concepts

Week 1 (1/2 week)

Objectives:

1. The student is able to locate appropriate areas and carry out expected objectives of the program.
2. The student is able to list types of health careers and the requisites and opportunities available in each.
3. The student is able to identify contributions to science and how the scientific method was utilized with the contribution.
4. The student will be able to identify the interrelationship of the various scientific fields.
5. The student will be able to identify science as the universal language by listing scientific terms and names.

Content:

A. Introduction to course
B. Use of Biological knowledge
    1. Preparation for vocation
        a. Health careers available
C. Science as inquiry-Scientific Method
    1. Procedure (Way in which science is approached)
        a. Identify problems, facts, or theories
        b. Nature of the problem
        c. Relationship or interaction of problems, facts and theories
    2. Way in which the scientific method has been used by earlier scientists
        a. early study of the body
        b. Aristotles methods and results
        c. Birth of modern anatomy (DaVinci, Versalium, Harvey)
D. The interrelationship of the various scientific fields (social science-life science and physical science
E. Language of science (Science Universal language)

Laboratory: Laboratory orientation and check in
The equipment and tools which they will be using throughout the course.

Field Experience: Career Day

Unit II

Unit Title - Use of Microscope

Week 1 - 1/2
2

Objectives:

1. The student will be expected to name the parts, functions and to operate the microscope and record what they observe. (Including oil immersion)

2. The student will be expected to identify the equipment for microphotography and to record what is visualized under the microscope by photographic methods.

3. The student will be expected to compare in writing the similarities and the differences of the electron microscope and the light microscope.

4. The student will be expected to used a ruler to measure the size of the object being examined on a prepared slide under the light microscope.

Content:

A. Light Microscope
  1. Construction of Microscope
  2. Care of the Microscope
  3. How to use Microscope
    a. Change objective-include focus
    b. Magnification
    c. Oil immersion
    d. Use both eyes when viewing through the microscope
    e. Draw objects viewed through the microscope
    f. Examine prepared slides

B. Microphotography
  1. Lighting
  2. Apparatus used

C. Electron Microscope
  1. Construction of
  2. Lens system
  3. Viewing and Recording of the image
  4. Methods of focusing

Laboratory: Study of microscope operating procedure. Microphotography Identify the parts of the microscope. (handling and cleaning the parts and accessories for the microscope will also be included in this laboratory experience) Conduct experiments to study the dimensions and magnification of a specimen. Utilization and practice the principles of microphotography. Record an observation for future reference by using microphotography.

Field Experience: Observation of Electron Microscope

Unit III

Unit Title - Cell Biology

Week 3

Objectives:

1. The student will be expected to identify the parts of a typical cell and the function of each part.
2. The student will be able to identify the physical processes by which the materials move across the cell membrane.

Content:

A. Anatomy of the cell
B. Organization of the Cell Membrane
C. Membrane Transports-Exchange of Materials
D. Organization of Cellular Function
    1. Nucleus
    2. Mitochondria
    3. Golgi Apparatus
    4. Lysosomes
    5. Ribosome
    6. Endoplasmic Reticulum

Laboratory Experience: Examination of various cells. (Preparation and identification of cell) Properties of solutions, colloids, and suspensions.
Prepare a slide of a plant cell and a slide of an animal cell. View previously prepared slides of plant and animal cells. Record observations of each of the slides. Conduct various experiments which will demonstrate the difference of solutions, colloids and suspensions.

Field Experience: Professional Observation

Unit III

Unit Title - Cell Biology

Week #4
5 ½

Objectives:

1. The student will be able to identify the significant changes that occur during meiosis and mitosis.
2. The student will be able to identify and compare the changes that occur at the site of uncontrolled cell growth, when the growth is considered malignant and when it is considered benign.
3. The student will be able to identify the physiological changes that occur in the cells of the aging person.
4. The student will be able to identify types of cell movements.

Content:

- E. Mitosis-meiosis
- F. Control of Cell Growth
  - 1. Malignant
  - 2. Benign
- G. Cell motility
- H. Cells and Aging

Laboratory: Mitosis

Utilizing onion roots, prepare slides which will demonstrate the different stages of mitosis.

Using the slides, compare observations of mitosis to diagrams or pictures of meiosis.

Using previously prepared slides, observe and compare a benign and a malignant cell and describe the similarities and differences of the two cells.

Observe an amoeba through the microscope, and describe the movement. A film could also be substituted for this activity.

Field Experience: American Cancer Society
Cancer research

Unit III

Unit Title - Cell Biology

Week 5 (1/2 week)

Objectives:

1. The student will be able to describe the sturcture of ATP and to identify ATP as the source of energy.

Content:

I. Cellular Metabolism (Use ATP for cellular function)
    1. Energy Metabolism
    2. Intra-cellular Oxidation

Laboratory:

Field Experience: General Hospital

Unit IV

Unit Title - Histology

Week #6
7 ½

Objectives:

1. The student will be able to identify the tissues or membranes of a mammal and the function of each classification.

2. The student will be able to identify and state the function of tissues or membranes which he observes on a previously prepared slide under a light microscope.

Content:

A. Classification of Tissues and Membranes
   1. Epithelial
   2. Muscle
   3. Connective
   4. Adipose
   5. Nervous
   6. Mucous Membrane
   7. Serous Membrane
   8. Synovial Membrane
   9. Cutaneous Membrane

Laboratory: Identification of tissues and membranes
Using previsouly prepared slides identify and classify the above mentioned tissues.
Record observations and the significance of these observations.

Field Experience:

Unit IV

Unit Title - Histology

Week #7 ½
8
9

Objectives:

1. The student will be able to prepare slides of tissues for microscopic examination, using a microtome and necessary materials.

Content:

B. Microtome Technique
   1. Fixing
   2. Paraffin Infiltration
   3. Embedding Paraffin
   4. Mounting and Trimming the Block
   5. Cutting with microtome
   6. Handling of Sections

Laboratory: Preparation and identification of tissues and membranes by microtome. Practice the principles of utilization of a microtome. Utilize techniques of preparation of tissues.

Field Experience: Hospital Cytology Lab.
Veterinarian
Family Medicine
Occupational Therapy
Physical Therapy

Unit V

Unit Title - Heredity and Evolution

Week 10

Objectives

1. The student will be able to compare the different theories of evolution and origin of life.

Content:

- A. Theories of Evolution
  - 1. Views of evolution before Darwin
  - 2. Darwins' Theory of Evolution
  - 3. Other theories
  - 4. Adaptation and Selection
- B. Origin of Life on Earth
  - 1. Spontaneous Generation
  - 2. Biogenesis

Laboratory: Evolution of population. Conduct experiments which will demonstrate biogenesis of micro-organisms, exercise in population genetics, and explain the significance of his observations.

Unit V

Unit Title - Heredity and Evolution

Week 11

Objectives:

1. The student will be able to identify and write the chemical structure of ~~and~~ DNA and RNA molecules.

Content:

C. Genetics
  1. DNA-RNA
  2. Protein Synthesis
  3. Genes in Action
    a. Multiple Genes
    b. Multiple Alleles
    c. Genes and Population

Laboratory: Dorosophila Genetics (Crossing fruit flies to study heredity) Experimental gentic cross of male and female dorosophila fruit flies.

Field Experience:
Genetic Laboratory
Radiation Experiment
Nuclear Power Plant
~~Professional Experience~~ Radiologist
Nursing
Dentistry

Unit V

Unit Title - Heredity and Evolution

Week 12
13 (½ of week)

Objectives:

1. The student will be able to identify and differentiate between male and female chromosomes using a light miscroscope and a prepared slide.
2. The student will create and identify mutations of fruit flies he has developed by using radiation.

Content:

4. Chromosomes
    a. Chromosome Theory of Heredity
    b. Sex Chromosomes
    c. Mapping Chromosomes
    d. Chromosome Aberration
    e. Mutations

Laboratory:

Effects of Nuclear Radiation on seeds.
Radiation induced alteration of chromosomes.
Remove the salivary glands from the dorosophila fruit flies and observe the chromosome development under the microscope.
Conduct experiments on irradiation induced mutations.

Field Experience:

Genetic Laboratory
Radiation Experiment
Nuclear Power Plant
~~Professional Experience~~ Radiologist
Nursing
Dentistry

Unit V

Unit Title - Heredity and Evolution

Week 13 ½ week
14 ½ week

Objectives:

1. The student will identify the possible blood types from the combination of ABO.

2. The student will list and identify genetic disease and the effects or radiation on man and other representative living organisms.

Content:

5. Genetic Disease
6. Human Heredity
   a. Heredity and Environment
      1) Effects of Radiation
   b. Heredity Patterns in Man

Laboratory: Study of Drosophila (cont.)

Field Expereince: Genetic Laboratory
Radiation Experiment
Nuclear Power Plant
~~Professional Experience~~ Radiologist
Nursing
Dentistry

Unit V

Unit Title - Heredity and Evolution

Week 14 ½ week
15

Objectives:

1. The student will determine the probability of occurence of abnormalities of human heredity using a binomial equation.

Content:

D. Probability and Genetics

Laboratory: Study of Drosophila (con't)
Exercise in genetics using chi square and binomial expansion.

Field Experience:
Genetic Laboratory
Radiation Experiment
Nuclear Power Plant
~~Professional Experience~~ Radiologist
Nursing
Dentistry

Unit VI

Unit Title - Microbiology

Week 16

Objectives:

1. The student will identify and name the different types of bacteria viewed on prepared slides through a light microscope.

Content:

- A. Bacteria
  - 1. Introduction
    - a. Nomenclature
    - b. Classification
  - 2. Characteristics of Bacteria
    - a. Anatomy of Bacteria
    - b. Cultivation of Bacteria

Laboratory: Preparation and sterilization of cultures. for bacterial growth.
Innoculation, incubation, examination
Collectinb bacteria from various objects.
Staining bacteria
Developing skill use of pipette

Field Experience: Observation in a Bacteriology Lab.

Unit VI

Unit Title - Microbiology

week 17

Objectives:

1. The student will prepare slides, view them, identify and name the micro-organisms which appear.

Content:

B. Other Micro-organisms
   1. Molds
   2. Yeast
   3. Virus
   4. Protozoa
   5. Algae
   6. Rickettsiae

Laboratory: Collection, identification and examination of the common micro-organisms.
Fermentation by yeast.
The student will prepare slides, slides view them through a light microscope, identify and name the micro-organisms which are on the slide.

Field Experience: Refinery.
Fossil Power Plant

Unit VI

Unit Title - Microbiology

Week 18
19

Objectives:

1. Given sufficient information the student will be able to identify the micro-organism used in industry.

2. Given required materials the student will be able to prepare bacterial medium for growth.

3. The student will be able to list and identify the disease related to micro-organisms.

Content:

C. Micro-organisms and Related Diseases
D. Applied Microbiology
    1. Microbiology of Water
    2. Microbiology of Sewage
    3. Microbiology of Air
    4. Microbiology of Milk
    5. Microbiology of Soil
    6. Microbiology of Foods
    7. Microbiology used in Industry
        a. Bacteria
        b. Yeast
        c. Molds

Laboratory:
Bacterial contents of various milk products.
Effects of temperature on rate of bacterial growth on milk.
Effects of pasteurization and boiling on bacterial content of raw milk.
Bacteriological analysis of water supplies.
Effects of antiseptics and antibiotics on bacterial growth.
Life in soil communities.

Field Experience:
Observation in industry
Bottling Company
Brewing Company
Food processing Company
Dairy Industry
Lab for soil and water testing

Unit VII

Unit Title - Immunology

Week 20

Objectives:

1. Given sufficient information the student will be able to identify the body defense against infection.
2. Given sufficient information the student will be able to identify and list components of blood that contribute to immunity.
3. Given the required materials the student will be able to type his own blood and identify the type.
4. Given sufficient information the student will be able to identify the problems related to organ and tissue transplants.

Content:

A. Infection and Immunity
   1. Body Defenses against Infection
   2. Antibody Formation
   3. Antigens
   4. Antibody-Antigen Reactions
   5. Antibiotics

B. Blood groups
   1. Typing
      a. ABO compatibility
      b. Rh
   2. Transfusion

C. Organ and Tissue Transplants

Laboratory: Blood Typing
Study of antibody-antigen reactions

Field Experience: Observation - Tissue Bank
Blood Bank
Allergy Center
Immunization Clinic

Unit VIII

Unit Title - Health

Week 21

Objectives:

1. Given the required materials the student will be able to identify the chemical substances found in alcohol and tobacco.

2. The student will be able to list the diseases related to the use of alcohol and tobacco.

3. Given the required materials the student will be able to construct a smoking machine to study the effects of tabacco.

Content:

A. Tobacco
   1. Substances in Tobacco
   2. Chemistry of Tobacco
   3. Effects of Tobacco on Man
   4. Related Disease
B. Alcohol
   1. Chemistry
   2. Misuse of Alcohol
   3. Related Diseases

Laboratory: Smoking Machine. Construct different types of smoking machines and study the physiological effects of smoking on a rat.

Field Experience: ~~Observation at Alcohol Anonymous~~

Unit VIII

Unit Title - Health

Week 22

Objectives:

1. Given sufficient information the student will be able to list and identify the drugs that are abused and their effects on the human body.

Content:

C. Drugs
  1. Types and Chemistry of
    a. Narcotics
    b. Sedatives and Tranquilizers
    c. Stimulating
    d. Mind-Affecting
  2. Addiction
  3. Use and misuses

Laboratory: Experiments utilizing drugs and rats.

Field Experience:
Speaker on Drugs
~~Observation at Health Department~~
Films
Observation at Alcoholics Anonymous

Unit VIII

Unit Title - Health

Week 23

Objectives:

1. Given sufficient information the student will be able to identify causes and prevention of epidemics.

2. Given sufficient information the student will be able to identify characteristics of diseases that are commonly epidemic.

3. Given sufficient information the student will be able to identify the various public health serivces.

Content:

D. Epidemics
    1. Controlling
    2. World Consequences
    3. Preventive Medicine
E. Public Health Services
    1. Health Agencies
    2. Health in Industry
    3. World Health Organization

Laboratory: (con't)

Field Experiences: Speaker on public health services, which will include the above described topics.
Observation at Health Department

Unit VIII

Unit Title - Health

Week 24

Objectives:

1. Given sufficient information the student will be able to identify current environmental problems and the diseases associated with them.

2. Given sufficient information the student will be able to identify problems of coping with stress in modern society.

Content:

F. Mental Health
    1. Reacting to Stress
    2. Common Problems
G. Environmental Health
    1. Air
    2. Sound
    3. Water
    4. Waste Disposal
    5. Soil
    6. Population

Laboratory: Determination of air, sound, water, soil, light, population, and waste pollution.
Ecological analysis at two habitats to observe the factors that enable organisms to live there.

Field Experience: Observation at Mental Health Clinic
Industrial Environmental Control (Chrysler & Toledo Edison)

Unit IX

Unit Title - Plant Physiology

Week 25

Objectives:

1. Given the required materials the student will be able to prepare slides and identify the parts of plants for microscopic examination.

Content:

A. Introduction
    1. Structure of Cell
    2. Function of Parts of Cell
B. Water Relation
    1. Absorption and translocation of water
    2. Stomatal Mechanism

Laboratory: Transports in plants
Life cycle of plants
Culturing of gametophytes or ferns
Study of tissues of leaf
Transpiration in plants

Field Experience: ~~Biology Department of University~~
Pharmacy School & Pharmacist

Unit IX

Unit Title - Plant Physiology

Week 26

Objectives:

1. Given sufficient information the student will be able to identify and write chemical reactions which take place in plants during respiration and photosynthesis.

Content:

C. Respiration and Ferementation

D. Translocation of Sugar

E. Photosynthesis

Laboratory:

Effects of light on photosynthesis
Separation of chloroplast pigaments

Field Experience:

Observation ~~(cont)~~ of Pharmaceutical Laboratory }
Observation of Department of Biology (Botany) }

Unit IX

Unit Title - Plant Physiology

Week 27

Objectives:

1. Given sufficient information the student will be able to identify and write the reaction that takes place when the plant metabolizes nitrogen.
2. Given sufficient information the studnet will be able to identify the plant growth hormones.
3. Given sufficient information the student will be able to identify and name the plants which have medical value.

Content:

F. Mineral Nutrition

G. Nitrogen Metabolism

H. Plant Growth Hormones

I. Synthetic Growth Hormones

Laboratory:

Mineral content of plant material
Effects of plant hormones on growth or roots
Plant growth and soil substance

Field Experience:

Unit X

Unit Title - Metabolism

Week 28

Objectives:

1. Given sufficient information the student will be able to identify and write the chemical structure of proteins, fats, and carbohydrates, and also the end products of metabolism.

Content:

A. Metabolism of Proteins

B. Metabolism of Fats

C. Metabolism of Carbohydrates
    1. Release of Energy from Glucose

D. Metabolism of Water

Laboratory: Study of physical and chemical properties of lipids
proteins and carbohydrates
Tests for water in food
Carbohydrates fermentation
Test for presence of carbon in carbohydrates

Field Experience: Research lab. metabolism

Unit X

Unit Title - Metabolism

Week 29

Objectives:

1. Given sufficient information the student will be able to solve the math equations of metabolism and determine caloric needs.

Content:

E. Metabolism of Minerals

F. Metabolism of Nucleic Acids

G. Caloric Value

H. Rate of Metabolism
    1. Body temperature

Laboratory:
- Preparation of nucleoprotein
- Chemical nature of enzymes
- Measurement of oxygen utilization rate of small organisms (lower animals)
- Utilization of calorimeter, for heat-exchange experiments
- Study of respiration rates in living organisms

Field Experience: University or local lab.

Unit XI

Unit Title - Nutrition

Week 30

Objectives:

1. Given sufficient information the student will be able to identify the functions of nutrients (proteins, carbohydrates, fats, minerals and vitamins)

Content:

A. Nutrients
    1. Proteins
    2. Carbohydrates
    3. Fats
    4. Minerals
    5. Vitamins
        a. Water Soluble
        b. Fat Soluble

Laboratory: Identification of common vitamins
Testing for detection of vitamins
Testing for presence of organic nutrients

Field Experience: Hospital dietician and diet kitchen

Unit XI

Unit Title - Nutrition

Week 31

Objectives:

1. The student will be able to list foods in the four basic groups.
2. The student will be able to construct a diet normal for a child, teenager, and adult.
3. The student will be able to compare diets of different ethnic groups.

Content:

B. Basic 4 Food Groups
    1. Construct Normal Diet
    2. Ethnic Differences

C. Dietary Problems

Laboratory: (cont.)

Field Experience: (cont.)

Unit XI

Unit Title - Nutrition

Week 31

Objectives:

1. The student will be able to identify problems of nutrition.
2. The student will be able to identify and name proteins, carbohydrates, fats, vitamins and mineral salts that are detected during the experiment.

Content:

C. Dietary Problems

Laboratory: (con't)

Field Experience: (con't)

Unit XII

Unit Title - Topics in Modern Biology

Week 33

Objectives:

1. The student will be able to identify the theories of extraterrestial life and alien environments.

Content:

A. Exobiology (Extraterrestial life)
   1. Theories
   2. Alien Environment (water composition of air)
   3. Life outside the solar system

Laboratory: Research project

Field Experience: Hyperbaric chamber

Unit XII

Unit Title - Topics in Modern Biology

Week 34

Objectives:

1. The student will be able to identify the physiological problem of space.

Content:

B. Problems in Space
    1. Physiological Factors
        a. Effects of temperature on the brain
        b. Effects of radiation on the cells
        c. Effects of acceleration on breathing and oxygenation of blood
        d. Effects of pressure on lungs, blood and bladder
        e. Effects of weightlessness on sensory organs
        f. Effects of vibration, sound, and light

Laboratory:

Field Experience:

Unit XII

Unit Title - Topics in Modern Biology

Week 35

Objectives:

1. The student will be able to identify psychological problems in space.
2. The student will be able to explain the life support systems used in space.
3. The student will be able to identify and expalin the biomedical instrumentation used in space and on earth.

Content:

2. Psychological factors
3. Preservation of food for space flight (canning, irradiation, freezing)
4. Life Support system
5. Biomedical instrumentation (man machine system)
   a. application on the earth

Laboratory: Utilize biomedical instruments for recording vital signs

Field Experience: Observation of biomedical instruments

Unit XII

Unit Title - Topics in Modern Biology

Week 36

Objectives:

1. The student will be able to identify the physiological and phychological problems of the underwater environment.

2. The student will be able to compare the problems of space with the problems of the underwater environment.

3. The student will be able to demonstrate application of principles of biology.

Content:

C. Problems in underwater environment
    1. Temperature and pressure
    2. Life support system
D. Applied Biology
    1. Agriculture
    2. Animal Breeding
    3. Environment
    4. etc., (to be determined by instructor)

Laboratory:

Field Experience:

Pre-Post Secondary Health Career Program

Second Year-Anatomy and Physiology

Unit I

Unit Title - Osteology System

Week 1

Objectives:

1. The student will be able to identify the microscopic structure of bone and cartilage by using a microscope.
2. The student will identify the bone and sinuses while viewing and handling the bone.

Content:

A. Structure of Bone and Cartilage

B. Ossification and Formation of Bone and Cartilage

C. Types of Bones

D. Sinuses

Laboratory: Chemical Composition of Bone
Microscopic examination of prepared slide of bone and cartilage

Field Experience: X-ray lab.
Osteopath
Orthopedic Surgeon
Artificial limb factory

Unit I

Unit Title - Osteology System

Week 2
3

Objectives:

1. The student will be able to name the bones of the skeleton of a mammal.

Content:

E. Bone Markings

F. Axial Skeleton

G. Appendicular Skeleton

Laboratory: Use a commercially prepared animal skeleton, or human skeleton to identify the bones.

Field Experience: (con't from week 1)

Unit I

Unit Title - Osteology System

Week 4

Objectives:

1. The student will be able to identify types of joints.
2. The student will be able to identify bone and joint disorders.
3. To reconstruct a dis-articulated animal (cat or dog) skeleton.

Content:

H. Arthrology
  1. Articulation-Movement

I. Bone and Joint Disorders
  1. Fracture
  2. Arthritis
  3. Osteomyolitis
  4. Dislocation
  5. Osteoporosis

Laboratory: Use a commercially prepared animal skeleton, or human skeleton to identify the bones.

Field Experience: (con't from week 1)

Unit II

Unit Title - Myology

Week 5
6 (½ week)

Objectives:

1. The student will be able to dientify three types of muscle tissues.
2. The student will be able to identify the chemical reaction that takes place during muscle contraction.
3. The student will construct a diagram of the myoneural junction.
4. The student will be able to list major chemicals which contribute to muscle contraction.

Content:

A. Structure of Muscle

B. Chemistry of Muscle Contraction (chemical changes during muscle contraction)
  1. Types of Muscle Contraction
     a. muscle response to different stimuli
  2. Myoneural Junction
  3. Effects of Muscle Exercise
  4. Muscles and bony levers

Laboratory: Dissection of cats.
Preparation and identification of different muscle tissues.
Kymograph experiments. Recording actions of muscle (use frogs)

Field Experience: Observation of EMG
Physical Therapy
Muscular Dystrophy Foundation

Unit II

Unit Title - Myology

Week 6 (½ week)
7
8 (½ week)

Objectives:

1. The student will be able to identify and list major groups of muscles and the point of insertion and origin of each muscle that is identified.
2. The student will be able to list the function of the identified muscle.

Content:

C. Classification of Skeletal Muscles
    1. Origin and insertion

Laboratory: Identification of muscles origin and insertion of a representative mammal
Identification of function of muscles of a representative mammal

Field Experience: (con't)

Unit II

Unit Title - Myology

Week 8 (½ week)

Objectives:

1. The student will be able to list muscle disorders and the significance of the disorder to man.

Content:

D. Muscle Disorders
  1. Muscular Dystrophy
  2. Muscular Atonia

Laboratory: Use kymograph to record reactions of muscles that have received chemical exposure.

Field Experience: (con't)

Unit III

Unit Title - Gastroenterology

Week 9

Objectives:

1. The student will be able, by disection of a representative mammal, to locate, identify, and state the function of the digestive organs.

Content:

A. Anatomy and physiology of digestive organs and glands

Laboratory : Disection of mammal
Location and identification of digestive organs

Field Experience:

Unit III

Unit Title - Gastroenterology

Week 10

Objectives:

1. The student will be able to compare the arrangement and function of teeth in man and other mammals.
2. The student will be able to locate, identify and name the taste buds for different senses of taste.
3. The student will be able to idnetify and describe the function of the digestive enzymes present in the mouth.
4. The student will be able to identify and describe the types of saliva and their sources.

Content:

B. Digestive Process
  1. Oral cavity
     a. dental hygiene
     b. development of teeth
  2. Mastication
     a. salivary glands
     b. digestive enzymes
  3. Tongue
  4. Oropharynx
  5. Esophagus

Laboratory: Conduct experiments on the relationship of smell and taste.
Conduct experiments on salivary digestion and the process of swallowing.
Determination of the time required for food to travel from the mouth to the stomach.

Field Experience: Observation dentist or dental hygienist
Observation of dental laboratory

Unit III

Unit Title - Gastroenterology

Week 11

Objectives:

1. The student will be able to identify, list and state the function of the digestive enzymes in the stomach.
2. The student will locate, identify and state the function of the stomach and compare the human stomach to that of other representative mammals. (eg. cow)

Content:

6. Stomach
   a. gastric glands
   b. movement of stomach
   c. digestive enzymes

Laboratory: Conduct experiments of action of digestive enzymes on different foods.

Field Experience: Observation of Gastroscopy or Gastroduodenoscopy

Unit III

Unit Title - Gastroenterology

Week 12

Objectives:

1. The student will be able to identify, list and state the function of the digestive enzymes in the small intestine.
2. The student will locate, identify, and state the function of the small and large intestine and compare the human intestine to that of other representative mammals.

Content:

7. Small Intestine
    a. digestive enzymes
    b. movement of intestine
    c. absrcption
8. Large Intestine

Laboratory: Conduct experiemnts of action of digestive enzymes on different foods.

Field Experience: Colostomy Club
American Cancer Society
Observation Sigmoidoscopy

Unit III

Unit Title - Gastroenterology

Week 13

Objectives:

1. The student will locate, identify, and state the function of other digestive organs and compare the representative mammals organs to those of the human.

2. The student will trace a bolus of food as it enters the mouth until it leaves the body. They are to identify each organ or area through which the food passes and state how the organ assists digestion.

3. The student will identify and list disorders of the digestive system and list the significance of each disorder.

Content:

9. Other organs
    a. liver
    b. gall bladder
    c. pancreas

C. Disorders of the Digestive System
    1. Cerrhosis
    2. Diahhrea
    3. Vomiting
    4. Food poisoning
    5. Constipation
    6. Hepatitis
    7. Ulcers
    8. Gases in GI tract

Laboratory: Chemistry of digestion

Field Experience: Observation in X-ray for gastric, bowel, and gall bladder x-ray

Unit IV

Unit Title - Circulatory

Week 14

Objectives:

1. The student will be able to identify and list the composition of blood, which includes the types of blood cells, and compare the composition of blood to that of other representative mammals.
2. The student will be able to determine the velocity of blood flow through the capillaries or other small vessels.

Content:

A. Hematology
   1. Composition of blood
   2. Bone Marrow
   3. Circulation of Blood
   4. Blood clotting

Laboratory: Prepare slide of white and red cells
Blood clotting time
Study of preparation of slide of hemin crystals.
Effect of O_2 and CO_2 on blood.

Field Experience: Hematology Lab.

Unit IV

Unit Title - Circulatory

Week 15
16

Objectives:

1. The student will be able to locate, identify and state the function of the major vessles of the representative mammal and compare the vessels to those of the human.

Content:

B. Vascular System (division of)
   1. Anatomy and physiology of arteries and veins
   2. Capillaries

Laboratory Location, identification and statement of function of major vessels of the vascular system

Field Experience Jobst Institute

Unit IV

Unit Title - Circulatory

Week 17

Objectives:

1. The student will locate, identify and state the function of the lymph nodes of the representative mammal and compare the lymph system to that of the human.

2. List the types of circulation and their function and compare the representative mammal's circulation to that of the human.

Content:

C. Lymphatic System
  1. Anatomy and physiology of lymphatic system
    a. tonsils and adenoids
    b. spleen

D. Types of Circulation
  1. Portal
  2. Renal
  3. Systemic
  4. Pulmonary
  5. Coronary
  6. Cerebral
  7. Cutaneous
  8. Muscular

E. Disorders of lymphatic system
  1. Tonsilitis
  2. Mononucleosis
  3. Hodgkins Disease

Laboratory: Location, identification and statement of function of the lymphatic system

Field Experience:

Unit IV

Unit Title - Circulatory

Week 18

Objectives:

1. The student will locate, identify and state the function of the parts of the heart of the representative mammal and compare the mammal heart to the human heart.
2. The student will trace the flow of blood through the human heart.
3. The student will be able to differentiate an abnormal and a normal electrocardiogram.
4. The student will be able to determine cardiac output and cardiac volume.

Content:

E. Cariology
   1. Anatomy and Physiology
   2. Heart walls and cavities
   3. Cardiac Cycle
   4. Heart Beat
   5. Heart Sounds
   6. Bioelectric Currents
   7. Electrocardiogram

Laboratory:	Disection of the heart, location, identification and statement of function Instrumentation utilized with the heart Using oscilloscope study the display of bioelectric phenomena of the heart Using a frog and kymograph study the heart rate of the frog
Field Experience:	Electrocardiogram American Heart Association

Unit IV

Unit Title - Circulatory

Week 19

Objectives:

1. The student will be able to determine the blood pressure of another person and will be able to state the significance of it.
2. The student will be able to locate the pressure points of the body and measure the pulse at these points.
3. The student will be able to identify the sounds elicited when determining a blood pressure.
4. The student will be able to calculate blood volume and velocity.
5. The student will be able to identify and list disorders of the circulatory system.

Content:

F. Physiology of Circulation
  1. Blood Pressure
    a. measurement
  2. Pulse
  3. Blood Distribution
  4. Calculation Blood volume and velocity

G. Disorders of Circulatory System
  1. Circulatory Shock
  2. Hypertension
  3. Coronary Occulusion
  4. Varicose Veins
  5. Cardiac Failure
  6. Rheumatic Fever

Laboratory: Measurement of blood pressure and pulse
Use sphygomanometer to measure blood pressure in various body positions, and before and after exercise.
Measure pulse in various body positions, and before and after exercise.

Field Experience: Stroke Club
Geriatric Center

Unit V

Unit Title - Respiration

Week 20

Objectives:

1. The student will be able to locate, identify and state the function of the respiratory organs or a representative mammal and compare them to the corresponding human organ.

Content:

A. Anatomy and Physiology of Respiratory Organs
   1. Nasal cavities
   2. Nasopharynx
   3. Laryngopharynx
   4. Larynx
   5. Trachea
   6. Bronchii
   7. Lungs
   8. Thorax

Laboratory: Locate, identify and state function of respiratory organs on a representative mammal

Field Experience:

Unit V

Unit Title - Respiration

Week 21

Objectives:

1. The student will be able to identify and explain the mechanism of inspiration and expiration.
2. The student will be able to calculate the capacity of the lungs and the respiratory quotient.
3. The student will be able to identify the chemical reaction that occurs during exchange of gases by the lung.
4. The student will be able to identify disorders of the respiratory system and their significance.

Content:

B. Mechanism of Inspiration and Expiration

C. Capacity of the Lungs
   1. Calculation of physiology of dead space

D. Transport of gases by blood

E. Respiratory Control

F. Respiratory quotient

G. Disorder of Respiratory System
   1. Pulmonary edema
   2. Pneumonia
   3. Emphysema (chronic obstruction lung disease)
   4. Asthma

Laboratory: Measure vital capacity
Kymograph to study rate of respiration
Sensory stimuli affecting respiration
Mechanism of breathing
Effects of pulmonary ventilation on respiration rate
Using respiration apparatus to study the breathing pattern.
Construct model to study mechanism of breathing.

Field Experience: Inhalation Therapy - Respiratory Therapy
Pulmonary Function Laboratory
Lost-Chord (Laryngectomy Club)

Unit VI

Unit Title - Neurology

Week 22 (½ week)

Objectives:

1. The student will be able to locate, identify and state the function of the divisions of the nervous system of the representative mammal and compare it to the corresponding system of the human.
2. The student will be able to identify various neurons by using a light microscope and previously prepared slides.
3. The student will be able to describe theories of neural condition.
4. The student will be able to identify different types of human reflexes.

Content:

A. Classification of Nervous System

B. Classification of neurons

C. Nerve impulse

D. Neural connection
   1. Reflexes
   2. Physiology of reflexes

Laboratory:

Disection, location, identification and statement of function of the nervous system of a representative mammal
Human reflexes
Reaction time and discrimination of different sensations
Condition reflex
Using oscilloscope the student will study the bioelectric phenomena that occurs in the neurons and the brain.

Field Experience:

Unit VI

Unit Title - Neurology

Week 22 (½ week)
23
24 (½ week)

Objectives:

1. The students will locate, identify, and state the function of the spinal nerves, spinal plexuses, cerebral spinal fluid and autonomic nervous system of the representative mammal and compare it to the corresponding system of the human.

Content:

E. Spinal Cord
   1. Spinal nerves
   2. Pathways of the cord
   3. Distribution of spinal plexus
   4. Cerebrospinal Fluid

F. Autonomic Nervous system
   1. parasympathetic
   2. sympathetic

Laboratory: Disection, location, identification of spinal cord, spinal nerves, and the autonomic nervous system

Field Experience: Multiple Scerosis Foundation
Accupuncture

Unit VI

Unit Title - Neurology

Week 24 (½ week)
25

Objectives:

1. The student will locate, identify and state the function of the brain and cranial nerves of the representative mammal and compare them to the corresponding part of the human.

2. The student will be able to list disorders of the brain and identify the significance of the disorders.

Content:

G. Brain
  1. Anatomy and Physiology
    a. forebrain
    b. mid brain
    c. hind brain

H. Cranial Nerves

I. Disorders of the nervous system
  1. Epilepsy
  2. Strokes
  3. Parkinson's Disease
  4. Meningitis
  5. Brain tumor

Laboratory: Disection, location, identification and statement of function of the brain and cranial nerves

Field Experience:
Epilepsy Foundation
Cerebral Palsy
Sunshine Children's Home
Psychiatric Unit (private or state)
Psychologist
Electroencephologram

Unit VIII

Unit Title - Eye

Week 26

Objectives:

1. The student will be able to locate, identify and state the function of the layers, muscles, accessory structure and fluid of the eye of the representative mammal and compare it to the corresponding area of the human.
2. The student will be able to describe the mechanism by which the image is formed on the retina.
3. The student will be able to compare the physical and chemical changes that occur between daytime and night time vision.

Content:

A. Anatomy of the eye
    1. Layers of the eye
    2. Muscles of the eye
    3. Accessory structures
    4. Fluid of the eye

B. Physics of vision

C. Chemistry of vision

Laboratory: Disection, location, identification and statement of function of the eye
Observe retina through opthalmoscope

Field Experience: Optometrist
Opthalmologist
Eye Bank

Unit VII

Unit Title - Eye

Week 27

Objectives:

1. The student will be able to construct a light pathway for eye.
2. The student will be able to interpret results of the Snellen eye chart examination.
3. The student will be able to list visual defects and disorders of the eye and state the significance of each.
4. Given sufficient information the student will be able to determine the strength of lens used for corrective vision.

Content:

D. Visual Path
   1. Reaction or retina

E. Visual Activity

F. Visual Defects

G. Disorders or diseases of the eye

Laboratory:
Snellen chart - Acuity of vision
Color Blindness Tests
Measure retinal image
Area of color sensitivity on the retain
Night vision
Steroscopic vision
Accomodation of the eye
Movement of eye when reading
Blindspot

Field Experience:
Optometrist
Opthalmologist

Unit VIII

Unit Title - Ear

Week 28

Objectives:

1. The student will be able to identify the visual parts of the ear using an otoscope.
2. The student will be able to identify and state the function of the parts of the ear and compare the shark's ear to the human ear.
3. The student will be able to trace a sound wave from the outer ear to the cortex of the brain.
4. The student will be able to determine sound intensity (decibels) using instruments.
5. The student will be able to compare the difference between the size of the oval window and the ear drum and state its significance.

Content:

A. Anatomy of the Ear
   1. External Ear
   2. Middle Ear
   3. Inner Ear

B. Mechanism of Hearing (auditory mechanism)
   1. Nature of sound
   2. Auditory sensation
   3. Auditory pathway
   4. Function of cerebral cortex in hearing

Laboratory:

Disection shark's inner ear
Auditory acuity
Transmission of sound
Characteristic of sound
Bone transmission of sound

Field Experience:

Otologist - Hearing Test
Speech - Hearing Therapy

Unit VIII

Unit Title - Ear

Week 29

Objectives:

1. The student will be able to identify different types of hearing tests and interpret the results.

Content:

C. Vestibular Function (vestibular sensation & maintenance of equilibrium)

D. Hearing Tests

E. Eustachian Tube

F. Hearing Disorder (hearing abnormalities)
   1. Tinitis
   2. Vertigo
   3. Otitis media
   4. Otosclerosis
   5. Types of deafness

Laboratory: Equilibrium
Conduct experiments on balance mechanism

Field Experience: (con't from Week 28)

Unit IX

Unit Title - Excretory

Week 30

Objectives:

1. The student will be able to identify and state the function of the excretory organs.
2. The student will be able to compare the human kidney to that of lower animals.

Content:

- A. Anatomy and Physiology of the Kidneys
- B. Anatomy and Physiology of the Ureters
- C. Anatomy and Physiology of the Bladder
- D. Anatomy and Physiology of the Urethra

Laboratory: Disection of kidney - Gross Anatomy

Field Experience: Home Kidney Machine
Kidney Foundation
Dialysis Center

Unit IX

Unit Title - Excretory

Week 31

Objectives:

1. The student will be able to test urine for chemicals, crystals and casts.
2. The student will be able to determine urine volume and osmosis pressure using simple math equations.
3. The student will be able to state the significance of the results of renal function tests.
4. The student will be able to identify the electrolytes that are retained and secreted from the kidney and by what mechanism this is accomplished.
5. The student will be able to identify the problems associated with urination.
6. The student will be able to identify the significance of the disorders of the excretory system.

Content:

E. Volume and Composition

F. Urine Formation

G. Urination (micturition)

H. Physiology of Kidney Disease

I. Artificial Kidney

J. Renal Regulation of Water and Electrolytes

K. Tests of Renal Function

L. Disorders of Excretory System
   1. Nephritis
   2. Kidney Stone
   3. Renal Hypertension

Laboratory: Compositon of the urine
Using artificial kidney conduct experiments on filtration

Field Experience: (cont. from week 30)

Unit IX

Unit Title - Excretory

Week 32 (½ week)

Objectives:

1. The student will be able to identify other excretory organs.
2. The student will be able to identify the significance of the skin disorders.

Content:

L. Anatomy and Physiology of the Skin
  1. Accessory Organs
    a. hair
    b. nails
    c. glands
  2. Skin Disorders
    a. leprosy
    b. acne
    c. eczema
    d. psoriesis
    e. herpes
  3. Skin color

Laboratory: mapping sweat glands
skin sensation
appearance of the skin

Field Experience: Burn unit
Burn institute

Unit X

Unit Title - Endocrinology

Week 32 (½ week)
     33 (½ week)

Objectives:

1. The student will be able to locate, identify adn state the function of each endocrine gland in a representative mammal and compare it to the human body structure.

2. The student will be able to identify the chemical structure and state the function of the hormones.

Content:

A. Physiology of Pituitary Glands

B. Physiology of Thyroid Glands

C. Physiology of Para-thyroid Glands

D. Physiology of Adrenal Glands

E. Physiology of Pancreas
    1. Islets of Langerhans
    2. Diabetes Mellitus
    3. Diabetes and Heredity
    4. Insulin
    5. Insulin in the Blood

Laboratory: Effects of throxine on frog metamorphosis
Effects of iodine on metamorphosis
Radioactive iodine as a tracer element
Inducing ovulation in frogs
Action of insulin and aloxan on the rat

Field Experience: Endrocinology Clinic

Unit X

Unit Title - Endrocrinology

Week 33 (½ week)

Objectives:

1. The student will be able to identify and state the function of the hormones of the digestive and reporudctive system.
2. The student will be able to identify disorders of the endocrine system.

Content:

F. Digestive Hormones

G. Physiology of Pineal Glands

H. Physiology of Thymus

I. Anatomy and physiology of the ovary
    1. menstruation

J. Disorders of the Endocrine System
    1. Goiter
    2. Hypothyroidism
    3. Hyperthyroidism
    4. Cretinism
    5. Cushing disease
    6. Diabetes mellitus

Laboratory: (con't week 32)

Field Experience: (cont. week 32)

Unit XI

Unit Title - Reproduction

Week 34 (1/2 week)

Objectives:

1. The student will be able to locate, name and state the function of the reproductive organs of a representative mammal and compare it to the human.

Content:

A. Anatomy and Physiology of Male and Female Reproductive Systems

Laboratory: Gross anatomy - compare to human

Field Experience:

Unit XI

Unit Title - Reproduction

Week 34 (½ week)
35
36 (½ week)

Objectives:

1. The student will be able to identify and describe the stages that the fertilized zygote progresses through.
2. The student will be able to compare fetal circulation to human circulation.
3. The student will be able to describe the embryotic membranes.

Content:

B. Introduction to Embryology
   1. Fertilization
   2. Implantation
   3. Embryotic Membrane (relation of embryo to uterus)
   4. Process of cleavage and formation of germ layers
   5. Early development of obdy form
   6. Establishment of organ systems
   7. Fetal circulation
   8. Development of organ systems

Laboratory: Examination of preserved embryos and fetus
Examination of prepared slides of early development of embryo
Use hen egg to study the development of the chick embryo

Field Experience: Doctor's Office
Planned Parenthood

Unit XI

Unit Title - Reproductive

Week 36 (½ week)

Objectives:

1. The student will be able to describe the birth process as it is related to the mother and the infant.
2. The student will be able to describe the disorders of the reproductive system.

Content:

C. Birth Process

D. Disorders of Reproductive System
   1. Tumors
   2. Prostatitis
   3. Complication of pregnancy
   4. Hypogonadism in male and female
   5. Hypergonadism in male and female

Laboratory: (con't from week 34-35)
Films birth process

Field Experience: (con't from week 34-35)

PRE-POST SECONDARY HEALTH CAREERS PROGRAM

1st Year - PHYSICAL SCIENCE

Unit I Atomic Structure and Bonding I

- A. History of knowledge of atomic structure
- B. Bohr model
- C. Periodic Table
- D. Types of bonds
    - 1. Ionic
    - 2. Covalent
    - 3. Metallic

Unit II Solutions

- A. Microscopic aspects
    - 1. Types of solutions
        - a. Solid-solid
        - b. Solid-liquid
        - c. Liquid-liquid
        - d. Gas-liquid
        - e. Gas-gas
    - 2. The solutions process
    - 3. Strength of solution - concentration
        - a. Solubility
        - b. Saturation
        - c. Molarity
        - d. Normality
- B. Macroscopic aspects
    - 1. Colligative properties
        - a. Boiling point elevation
        - b. Freezing point depression
    - 2. Conductivity
    - 3. Osmosis
    - 4. Colloids
    - 5. Dialysis
- C. Aqueous Solutions
    - 1. Acids and bases - pH
    - 2. Neutralization
    - 3. Oxidation - reduction in solutions
    - 4. Stoichiometry of solutions

Unit III States of Matter

- A. Microscopic distinctions

States of Matter (con't)

- B. Change of state
  - 1. Latent heat
  - 2. Cooling curves
- C. Properties of liquids
  - 1. Mechanical
  - 2. Vapor pressure
- D. Properties of solids
  - 1. Mechanical
  - 2. Crystals

Unit IV Atomic Structure and Bonding II

- A. Electronic configuration
- B. Ionization potential
- C. Electronegativity
- D. Molecular orbitals
- E. Valence
- F. Bond energy

Unit V Stoichiometry

- A. Molecular formulas and Formula weights
- B. Oxidation numbers
- C. Gram equivalents
- D. Balanced equations

Unit VI Organic Chemistry I

- A. Carbon chemistry
- B. Organic functional groups
- C. Properties of the organic classes (descriptive physical)

Unit VII Nuclear Chemistry and Physics

- A. Nuclear structure
  - 1. Nucleons and elementary particles
  - 2. Isotopes, isobars and isotones
  - 3. Stability curve
  - 4. Nuclear force and binding energy
- B. Nuclear transformations
  - 1. Alpha decay
  - 2. Beta decay
  - 3. Fission

    - a. Mass-energy equivalence
    - b. Half-life

  - 4. Fusion
- C. Quantum mechanics of nuclear physics
  - 1. Uncertainty Principle
  - 2. Wave-particle duality
  - 3. Nuclear energy levels
  - 4. Gamma rays

Unit VIII Health Physics - Damaging, Therapeutic and Diagnostic Radiation Effects

- A. Dosage units
- B. Radiation effects
- C. Protection
- D. Dectection

Unit IX The Atom and Electromagnetic Waves

- A. Hydrogen atom
  - 1. Atomic energy levels
  - 2. Hydrogen spectrum
- B. Complex atoms
  - 1. Exclusion principle
  - 2. Spin
- C. Wave functions
- D. Atomic spectroscopy
- E. X-ray production and detection
- F. Electromagnetic radiation

Unit X Water and Hydrates

- A. Physical properties
  - 1. Structure of water
  - 2. Density variations with temperature and state changes
- B. Ionization of water
- C. Hydrates
- D. Acids, Bases and Salts
  - 1. pH
  - 2. Neutralization and titrations
  - 3. Hydrolysis of salts
  - 4. Buffers

Unit XI Organic Chemistry II

- A. Hydro carbons
  - 1. Family names
  - 2. Structural properties
  - 3. Chemical properties
  - 4. Polymerization
  - 5. Petroleum
- B. Organic classes - physical and chemical properties
  - 1. Alcohols
  - 2. Phenols
  - 3. Ethers
  - 4. Aldehydes
  - 5. Ketones
  - 6. Carboxyl acids
  - 7. Esters
  - 8. Amines
  - 9. Amides
  - 10. Soaps

Unit XII Energy Sources

- A. The Sun
- B. Fossil fuels
  - 1. Energy conversion
  - 2. Efficiency of conversion
- C. Wind and water sources
- D. Solar cells
- E. Nuclear power
- F. Fuel cells
- G. Modern topics
  - 1. Tidal power
  - 2. Geothermal power
  - 3. Thermal gradients in the ocean

Unit XIII The Biosphere

- A. Earth cycles
  - 1. Energy
  - 2. Water
  - 3. Oxygen
  - 4. Nitrogen
  - 5. Carbon
  - 6. Mineral
- B. Meteorology
  - 1. Temperature and pressure measurements
  - 2. Satellites - forecasting tools
  - 3. Weather systems
- C. Food Supply

Unit XIV Electro chemistry

- A. Electrolysis
- B. Electroplating
- C. Electricity production
  - 1. Half-reactions
  - 2. Oxidation potential
- D. Devices
  - 1. Lead storage battery
  - 2. Dry cells
  - 3. Fuel cell

Unit XV Bio chemistry

- A. Carbohydrates

  - 1. Monosaccharides
  - 2. Disaccharides
  - 3. Polysaccharides
- B. Lipids
  - 1. Fats
  - 2. Complex Lipids
  - 3. Steroids

C. Proteins
   1. Amino acids
   2. Protein structure
   3. Classifications
D. Nuclear Acids
   1. Polynucleotids structure
   2. DNA
   3. RNA
E. Vitamins
   1. Sources of vitamins
   2. Vitamin groups - structure and function
F. Hormones
G. Drugs
   1. Natural drugs
   2. Synthetic drugs

Unit XVI Inorganic Chemistry

A. Alkali and Alkaline Earth metals
   1. Physical properties
   2. Chemical properties

      a. Preparation
      b. Uses
      c. Compounds

B. Transition elements
   1. Sc, Ti, V, Cr and Mn subgroups
   2. Fe and Pt triads
   3. Cu and Zn subgroups
C. B, C and N families
D. The halogen and oxygen families
E. The noble gases

Unit XVII Descriptive Astronomy

A. The solar system
B. The galaxy
C. The far reaches of space

Pre-Post Secondary Health Careers Program

2nd Year - Physical Science

I. Mechanics of Solids

- A. Statics
  - 1. Forces as vecors
  - 2. Force equilibrium
  - 3. Moments
  - 4. Moment equilibrium
  - 5. Static Friction
- B. Simple machines
  - 1. Levers
  - 2. Inclined planes
  - 3. Theoretical mechanical advantage
- C. Kinematics
  - 1. Displacement, $\vec{s}$
  - 2. Velocity, $\vec{v} = \frac{d\vec{s}}{dt}$
  - 3. Acceleration, $\vec{a} = \frac{d\vec{v}}{dt}$
- D. Dynamics
  - 1. Newton's First Law, - inertia
  - 2. Newton's Second Law - $\vec{F} = m\vec{a}$
    - a. Weight vs. mass
    - b. Gravitational - inertial mass equivalence
  - 3. Newton's Third Law - propulsion
- E. Work and Energy
  - 1. Work = force x distance
  - 2. Energy
    - a. Potential, gravitational
    - b. Kinetic
    - c. Chemical
    - d. Heat
    - e. Electrical
  - 3. Energy conversion
  - 4. Conservation of energy
- F. Friction
  - 1. Static
  - 2. Kinetic
  - 3. Rolling
  - 4. Effects on machines
    - a. Actual mechanical advantage
    - b. Efficiency
- G. Momentum
  - 1. Impulse = $\int \vec{F} dt$
  - 2. Momentum = $m\vec{v}$
  - 3. $\int \vec{F}\, dt = \Delta m\vec{v}$
  - 4. Conservation of momentum in collisions
- H. Rotational motion
  - 1. Rotational analogs to linear kinematic quantities
  - 2. Center of mass
  - 3. Moment of inertia
  - 4. Torque
  - 5. Contripetal force
  - 6. Combined rotational and kinematic motion

I. Gravity and orbital mechanics
   1. Universal law of gravitation
   2. Elliptical orbits
   3. Escape velocity

II. Mechanics of fluids

   A. Statics
      1. Mass density
      2. Pressure
      3. Archimede's Principle
      4. Pascal's Law - hydraulic press
      5. Surface tension
      6. Capillary action
   B. Dynamics
      1. Rate of flow
      2. Bernoulli's Equation - conservation of energy
      3. Turbulence
      4. Viscosity
      5. Superfluidity

III. Kinetic Theory

   A. Statistical description of energy states
   B. Velocity distribution of molecules
   C. Macroscopic effects
      1. Pressure
      2. Temperature
   D. Chemical kinetics
      1. Reaction rates
      2.
      3.

IV. Heat and Thermodynamics

   A. Temperature
      1. Kinetic explanation
      2. Measurement
   B. Heat energy
      1. Calorimetry
      2. Electrical eqivalent
      3. Mechanical equivalent
   C. Effects of heat
      1. Expansion - solids, liquids and gases
      2. Changes of state - latent heats
      3. Superconductivity
   D. Thermodynamics
      1. Statistical description of energy states
      2. Zeroth Law
      3. First Law
      4. Second Law
   E. Heat engines
      1. Carnot cycle
      2. Otto cycle
      3. Efficiency

V. Basic Electricity

- A. Electrostatics
  - 1. Coulomb's Law
  - 2. Potential difference
  - 3. Capacitance
- B. Direct Current
  - 1. Defining current and voltage
  - 2. Sources of DC emf
  - 3. Measurement devices
  - 4. Ohm's Law
  - 5. Kirchoff's Laws
  - 6. Series and parallel circuits
- C. Magnetism
  - 1. Magnetic field production
  - 2. Interactions with moving charge
  - 3. Induced voltage
  - 4. Inductance
- D. Alternating Current
  - 1. AC generaction
  - 2. Terms
    - a. Peak
    - b. Effective
    - c. Average
  - 3. Measurement devices
  - 4. Reactance
  - 5. Impedance
  - 6. Phuse angle
  - 7. Motors

VI. Wave Phenomena

- A. Wave Theory
  - 1. Simple Harmonic Motion
    - a. Simple pendulum
    - b. Spring mass system
    - c. Circular motion projection
  - 2. Continuous media
    - a. Vibrating string - transverse waves
    - b. Water waves
    - c. Pressure waves in air - longitudial waves
  - 3. Superposition
  - 4. Standing waves
- B. Light
  - 1. Geometrical optics
    - a. Ray diagrams
    - b. Reflection
    - c. Refraction
    - d. Thin lenses
  - 2. Optical instruments
    - a. Microscope
    - b. Telescope
    - c. Eyeglasses
    - d. Camera

- 3. Physical optics
  - a. Interferance
  - b. Diffraction
  - c. Dispersion
  - d. Polarization
  - e. Intensity
  - f. Illumination
- C. Sound
  - 1. Speed of sound
    - a. Variation with temperature
    - b. The sound barrier
  - 2. Doppler effect
  - 3. Beat frequency
  - 4. Sound intensity
    - a. Decible scale
    - b. Hearing curve
    - c. Noise pollution
  - 5. Acoustic materials

VII. Electronics

- A. Solid State devices
  - 1. Crystal structure
    - a. Electrons and holes
    - b. Doping
  - 2. Energy bands
    - a. Valence
    - b. Forbidden
    - c. Conduction
  - 3. Junction diode
  - 4. Junction transistor
  - 5. FET
  - 6. MOSFET
  - 7. Tunnel diode
  - 8. Integrated Circuits
- B. Basic electronic circuits
  - 1. Amplifiers
  - 2. Oscillators
  - 3. Ramp generators
  - 4. Pulse circuits
- C. Instrumentation
  - 1. ECG
  - 2. EEG
  - 3. Defibrulator
  - 4. Pace-maker
- D. Safety

VIII. Astrophysics

- A. Research instruments
  - 1. Optical telescopes
  - 2. Radio telescopes
  - 3. Spectrophotometer

B. The sun
    1. Energy production in the sun
    2. Solar spectrum
    3. Solar storms and flares
C. Stars
D. Quasars
E. Black holes
F. Interstellar gas

PRE-POST SECONDARY HEALTH CAREERS PROGRAM

1st Year Physical Science

Week 1 Unit I Atomic Structure and Bonding I

Objectives:

1. The student will be able to describe the Bohr model of atomic structure.
2. The student will be able to explain the periodic table in terms of number of protons in the nucleus and number of electrons in the various orbits.
3. The student will be able to describe qualitatively the difference between ionic, covalent and metallic bonds.

Content:

A. History of knowledge of atomic structure
B. Bohr model of atomic structure
C. The periodic table
D. Types of bonds
    1. Covalent
    2. Ionic
    3. Metallic

Laboratory:

Measurements and significant figures

Week 2 Unit II Solutions

Objectives:

1. The student will be able to differentiate between mixtures, solutions and suspensions.
2. The student will be able to give examples of the various types of solutions.
3. The student will be able to calculate the molarity and normality of solutions from the macroscopic quantities of constituents involved.

Content:

A. Microscopic aspects
   1. Types of solutions (solid-solid, liquid-gas, liquid-liquid,etc.)
   2. The solution process
   3. Strength of solutions-concentration
      a. Solubility
      b. Saturation
      c. Molarity
      d. Normality

Laboratory:

Factors affecting solubility

Week 3 Unit II Solutions

Objectives:

1. The student will be able to predict the freezing point depression and boiling point elevation of aqueous solutions.

2. The student will be able to describe the processes of conduction and osmosis.

3. The student will be able to describe qualitatively the various colloidal suspensions.

Content:

B. Macroscopic aspects
    1. Colligative properties
        a. Freezing point depression
        b. Boiling point elevation
    2. Conductivity
    3. Osmosis
    4. Colloids
    5. Dialysis

Laboratory:

Colligative properties and conductivity

Week 4 Unit II Solutions

Objectives:

1. The student will be able to explain the qualitative differences between acids and bases.
2. The student will be able to describe the neutralization process qualitatively.
3. The student will be able to write balanced equations for oxidation-reduction reactions in solutions.

Content:

C. Aqueous solutions
    1. Acids and bases-pH
    2. Neutralization
    3. Oxidation-reduction in solutions
    4. Stoichiometry

Laboratory:

The properties of acids and bases

Week 5 Unit III States of Matter

Objectives:

1. The student will be able to describe the microscopic and macroscopic distinctions between the three states of matter.
2. The student will be able to explain a colling curve in terms of heat capacity and latent heats.

Content:

- A. Microscopic distinction
- B. Changes of state
  - 1. Colling curve
  - 2. Latent heat
  - 3. Heat capacity
- C. Properties of liquids
  - 1. Mechanical
  - 2. Vapor pressure
- D. Properties of solids
  - 1. Mechanical
  - 2. Crystals

Laboratory:

The liquid-solid colling curve of napthalene

Week 6 Unit IV Atomic Structure and Bonding II

Objectives:

1. The student will be able to explain the periodic table in terms of electronic configuration.
2. The student will be able to describe the various types of chemical bonds in terms of valence and bond energy.

Content:

A. Electronic configuration
B. Ionization potential
C. Electronegativity
D. Molecular orbitals
E. Valence
F. Bond energy

Laboratory:

Molecular size

Week 7   Unit V   Stoichiometry

Objectives:

1. The student will be able to determine molecular and formula weights from the chemical formula.
2. The student will be able to balance equations.

Content:

- A. Molecular formulas and formula weights
- B. Oxidation numbers
- C. Gram equivalents
- D. Balanced equations

Laboratory:

Determination of an empirical formula

Week 8 Unit VI Organic Chemistry I

Objectives:

1. The student will be able to give the basic physical and chemical properties of carbon and simple carbon compounds.

2. The student will be able to distinguish the different organic functional groups by physical properties.

Content:

A. Carbon chemistry
B. Organic functional groups
C. Physical properties of the organic classes

Laboratory:

Physical properties of the organic classes.

Week 9 Unit VII Nuclear Chemistry and Physics

Objectives:

1. The student will be able to list the three basic constituents of the atom with their properties.
2. The student will be able to explain the difference between isotopes, Bobars and isotones in terms of nuclear constituents.
3. The student will be able to explain the stability curve in terms of nuclear force and binding energy.

Content:

A. Nuclear structure
    1. Nucleons and elementary particles
    2. Isotopes, isobars and isotones
    3. Stability curve
    4. Nuclear force and binding energy

Laboratory:

The geiger-muller tube
Half-life

Week 10 Unit VII Nuclear Chemistry and Physics

Objectives:

1. The student will be able to explain alpha decay, beta decay, fission and fusion qualitatively.
2. The student will be able to determine the half-life of a radioactive sample from knowledge of its activity as a function of time.
3. The student will be able to predict the energy of a nuclear reaction from a knowledge of the masses involved.

Content:

B. Nuclear transformations
   1. Alpha decay
   2. Beta decay
   3. Fission
      a. Mass-energy equivalence
      b. Half-life
   4. Fusion

Laboratory:

The cloud chamber
Half-life

Week 11 Unit VII Nuclear Chemistry and Physics

Objectives:

1. The student will be able to explain the meaning of Heisenberg's uncertainty principle.
2. The student will be able to give a qualitative basis for the belief in wave-particle duality.
3. The student will be able to explain gamma ray energies in terms of nuclear energy levels.

Content:

C. Quantum mechanics of nuclear physics
   1. Heisenberg's uncertainty principle
   2. Wave-particle duality
      a. Experimental basis
      b. Implications
   3. Nuclear energy levels
   4. Gamma rays

Laboratory:

The gamma ray spectrum (Probable field experience)
Half-life

Week 12 Unit VIII Health Physics - Hazardous, Therapeutic and Diagnostic Aspects of Radioactivity

Objectives:

1. The student will be able to explain the dosage units.
2. The student will be able to specify means of protection from various radioactive particles.
3. The student will be able to describe techniques of detecting radioactive particles.

Content:

A. Dosage units
B. Radioation effects
C. Protection from radiation damage
D. Detection of radioactivity

Laboratory:

The absorption of gamma rays

Week 13 Unit IX The Atom and the Electromagnetic Spectrum

Objectives:

1. The student will be able to explain the hydrogen spectrum in terms of atomic energy levels.
2. The student will be able to state the Pauli exclusion principle.
3. The student will be able to describe the relationship of the exclusion principle to the periodic table.

Content:

A. The hydrogen atom
  1. Atomic energy levels
  2. The hydrogen spectrum
B. Complex atoms
  1. The Pauli exclusion principle
  2. Spin
C. Wave functions

Laboratory:

The hydrogen spectrum

Week 14 Unit IX The Atom and the Electromagnetic Spectrum

Objectives:

1. The student will be able to describe the basis of atomic spectroscopy.
2. The student will be able to explain the electromagnetic spectrum in terms of atomic and nuclear energy levels.

Content:

D. Atomic spectroscopy
E. Electromagnetic radiation
F. X-ray production and detection

Laboratory:

Atomic spectroscopy

Week 15 Unit X Water

Objectives:

1. The student will be able to explain the peculiar density change of water with temperature on the basis of molecular structure.
2. The student will be able to describe the process of ionization.
3. The student will be able to explain the significance of a hydrate.

Content:

A. Physical properties
    1. Molecular structure
    2. Density variations with temperature and during changes of state
B. Hydrates
C. Ionization of water

Laboratory:

Water of hydration

Week 16 Unit X Water

Objectives:

1. The student will be able to determine the pH of an acid or base given the molarity or normality of the solution.
2. The student will be able to determine the concentration of an acid or base by performing a titration.
3. The student will be able to describe hydrolysis reactions.
4. The student will be able to explain the action of a buffer.

Content:

D. Acids, bases and salts
   1. Concentration, pH
   2. Neutralization and titration
   3. Hydrolysis of salts
   4. Buffers

Laboratory:

Titration of acids and bases

Week 17 Unit XI Organic Chemistry II

Objectives:

1. The student will be able to name and give important physical and chemical properties of the alkanes, alkenes, alkynes and aromatic hydrocarbons.
2. The student will be able to describe polymerization.

Content:

A. Hydrocarbons
   1. Family names
   2. Structural properties
   3. Chemcial properties
   4. Polymerization
   5. Petroleum

Laboratory:

Qualitative analysis of hydrocarbons

Week 18 Unit XI Organic Chemistry II

Objectives:

The student will be able to give important physical and chemical properties of alcohol, phenols, ethers, aldehydes and ketones.

Content:

B. Organic classes
  1. Alcohol
  2. Phenols
  3. Ethers
  4. Aldehydes
  5. Ketones

Laboratory:

Qualitative analysis of organic classes

Week 19 Unit XI Organic Chemistry II

Objective:

The student will be able to give the important physical and chemical properties of carboxyl acids, esters, amines, amides and soaps.

Content:

B. Organic classes
    6. Carboxyl acids
    7. Esters
    8. Amines
    9. Amides
    10. Soaps

Laboratory:

Qualitative analysis of organic classes

Week 20 Unit XII Energy Sources

Objectives:

1. The student will be able to explain the significance of the sun in the conventional energy sources.
2. The student will be able to explain the meaning of efficiency of energy sources.

Content:

- A. The sun
- B. Fossil Fuels
  - 1. Energy conversion
  - 2. Efficiency of conversion
- C. Wind and water sources
- D. Solar cells

Laboratory:

Energy from the sun - solar cells.

Week 21 Unit XII Energy Sources

Objective:

The student will be able to describe some of the more modern sources of energy.

Content:

E. Nuclear energy
F. Fuel cells
G. Modern topics
    1. Tidal energy
    2. Geothermal energy
    3. Thermal gradients in the ocean

Laboratory:

Potential gradient in the atmosphere

Week 22 Unit XIII Near Earth Environment

Objectives:

1. The student will be able to describe the mechanics of satellite orbits.
2. The student will be able to discuss the important features of the orbital environment.

Content:

A. Satellite mechanics
B. Orbital environment

Laboratory:

Effects of a vacuum

Week 23 Unit XIV The Biosphere

Objective:

The student will be able to describe the various earth cycles and their interrelationships.

Content:

A. Earth cycles
  1. Energy
  2. Water
  3. Oxygen
  4. Nitrogen
  5. Carbon dioxide
  6. Mineral

B. Comparisons with other planets

Laboratory:

Week 24 Unit XIV The Biosphere

Objectives:

1. The student will be able to explain the use of various instruments used in meteorological measurements.
2. The student will be able to describe the major types of weather systems.

Content:

C. Meteorology
    1. Instruments for measurement
        a. Temperature
        b. Pressure
        c. Humidity
        d. Wind velocity
        e. Pollutants
    2. Satellites
    3. Weather systems
D. Food supply

Laboratory:

Weather station (probable field experience)

Week 25 Unit XV Electrochemistry

Objectives:

1. The student will be able to explain electrolysis and electroplating.
2. The student will be able to determine complex reactions and electrode potentials by combining half-reaction equations.

Content:

- A. Electrolysis
- B. Electroplating
- C. Electricity production
  - 1. Half-reactions
  - 2. Oxidation potentials

Laboratory:

Electroplating of metals

Week 26 Unit XV Electrochemistry

Objectives:

1. The student will be able to describe the chemical reactions which take place in the lead storage battery, the carbon-zinc dry cell, the alkaline-manganese cell, the mercury cell and the oxygen-hydrogen fuel cell.

2. The student will be able to describe the advantages and disadvantages of each of the devices studied.

Content:

D. Devices
  1. Lead storage battery
  2. Dry cells
    a. Carbon-zinc
    b. Alkaline-manganese
    c. Mercury
  3. Fuel cell

Laboratory:

Primary cell

Week 27 Unit XVI Biochemistry

Objectives:

1. The student will be able to name the major carbohydrates.
2. The student will be able to identify the important physical and chemical properties of the carbohydrates.

Content:

A. Carbohydrates
    1. Monosaccharides
    2. Dissacharides
    3. Polysaccharides

Laboratory:

Properties of carbohydrates

Week 28 Unit XVI Biochemistry

Objectives:

1. The student will be able to name the important lipids.
2. The student will be able to identify the important physical and chemical properties of the various lipids.

Content:

B. Lipids
   1. Fats
   2. Complex lipids
   3. Steroids

Laboratory:

Properties of Lipids

Week 29 Unit XVII Biochemistry

Objectives:

1. The student will be able to name the basic proteins.
2. The student will be able to classify the basic proteins by structure.
3. The student will be able to identify the important physical and chemical properties of proteins.
4. The student will be able to identify the important physical and chemical properties of DNA and RNA.

Content:

C. Proteins
    1. Amino acids
    2. Protein structure
    3. Classification
D. Nucleic acid
    1. Polynucleotids structure
    2. DNA
    3. RNA

Laboratory:

Properties of proteins

Week 30 Unit XVI Biochemistry

Objectives:

1. The student will be able to name the vitamin families and important physical and chemical properties of each family.
2. The student will be able to explain the function of hormones.
3. The student will be able to explain the difference between natural and synthetic drugs.

Content:

- E. Vitamins
    - 1. Sources of vitamins
    - 2. Vitamin groups
        - a. Structure
        - b. Function
- F. Hormones
- G. Drugs
    - 1. Natural
    - 2. Synthetic

Laboratory:

Properties of proteins

Week 31 Unit XVII Inorganic Chemistry

Objectives:

1. The student will be able to name the major elements in the alkali and alkaline-earth groups.
2. The student will be able to identify the important physical and chemical properties which differentiate these groups from others in the periodic table.

Content:

A. Alkali and alkaline-earth metals
  1. Physical properties
  2. Chemical properties
    a. Preperation
    b. Uses
    c. Compounds

Laboratory:

The preperation and hydrolysis of magnesium oxide

Week 32 Unit XVII Inorganic Chemistry

Objectives:

1. The student will be able to name the major transition elements of the Sc, Ti, V, Cr and Mn subgroups.
2. The student will be able to identify the important physical and chemical properties exhibited by these transition elements.

Content:

B. Transition elements I - Sc, Ti, V, Cr and Mn subgroups
  1. Physical properties
  2. Chemical properties
    a. Preperation
    b. Uses
    c. Compounds

Laboratory:

Qualitative analysis of transition elements

Week 33 Unit XVII Inorganic Chemistry

Objectives:

1. The student will be able to name the major transition elements of Fe, Co, Ni, Cu and Zn subgroups.

2. The student will be able to identify the important physical and chemical properties exhibited by these transition elements.

Content:

C. Transition elements II - Fe, Co, Ni, Cu and Zn subgroups
   1. Physical properties
   2. Chemical properties
      a. Preperation
      b. Uses
      c. Compounds

Laboratory:

Identifying minerals and ores

Week 34 Unit XVII Inorganic Chemistry

Objectives:

1. The student will be able to name major elements in the boron, carbon and nitrogen families.
2. The student will be able to identify the important physical and chemical properties exhibited by elements in these families.

Content:

C. Boron, carbon and nitrogen families
  1. Physical properties
  2. Chemical properties
    a. Preperation
    b. Uses
    c. Compounds

Laboratory:

Qualitative analysis - tests for ions of these families

Week 35 Unit XVII Inorganic Chemistry

Objectives:

1. The student will be able to name the major elements in the halogen and oxygen families.
2. The student will be able to identify the important physical and chemical properties exhibited by these families.

Content:

D. The halogen and oxygen families
  1. Physical properties
  2. Chemical properties
    a. Preperation
    b. Uses
    c. Compounds

Laboratory:

Preperation and properties of chlorine

Week 36 Unit XVII Inorganic Chemistry

Objectives:

1. The student will be able to name the noble gases.
2. The student will be able to identify the important physical and chemical properties of the noble gases.

Content:

E. The noble gases
  1. Physical properties
  2. Chemical properties
    a. Preperation
    b. Uses
    c. Compounds

Laboratory:

PRE-POST SECONDARY HEALTH CAREERS PROGRAM

2nd YEAR PHYSICAL SCIENCE

Mechanics of Solids

Week 1
Unit I

Objectives:

1. The student will be able to determine the resultant of two or more concurrent coplaner forces.
2. The student will be able to apply the condition for translational equilibrium to simple concurrent coplaner force systems to determine unknown forces.
3. The student will be able to determine the moment of any force about any point containing that force.
4. The student will be able to apply the condition for rotational equilibrium, in conjunction with that for translational, to determine unknown forces in systems of coplaner forces.

Content:

A. Statics

   1. Forces as vectors in two dimensions
   2. Force equilibrium
   3. Moments
   4. Moment equilibrium

Laboratory:

Force table

Week 2
Unit I

Mechanics of Solids

Objectives:

1. The student will be able to apply the conditions for equilibrium to problems involving levers and inclined planes.
2. The student will be able to use the theoretical mechanical advantages of levers and inclined planes to solve frictionless systems.
3. The student will be able to extend the ideas of levers and inclined planes to compound machines.

Content:

5. Static Friction

B. Machines

1. Levers
    a. Wheel and axel
    b. Pulley systems
2. Inclined planes
3. Theoretical mechanical advantage

Laboratory:

Mechanical advantage

Week 3
Unit I

Mechanics of Solids

Objectives:

1. The student will be able to define displacement, velocity and acceleration.

2. The student will be able to apply the kinematic relations to motion in two demensions.

Content:

C. Kinematics

   1. Displacement, $\vec{s}$
   2. Velocity, $\frac{d\vec{s}}{dt}$
   3. Acceleration, $\frac{d\vec{v}}{dt}$

Laboratory:

Kinematics

Week 4
Unit I

Mechanics of Solids

Objectives:

1. The student will be able to state Newton's three laws of motion and identify those laws in action in the real world.
2. The student will be able to determine the motion of an object from knowledge of its mass, the forces acting on it and the rules of kinematics,
3. The student will be able to explain the differances between weight and mass,

Content:

D. Dynamics

1. Newton's First Law of Motion - inertia
2. Newton's Second Law of Motion - $\vec{F} = m\vec{a}$
    a. Weight and mass
    b. Gravitational-inertial mass equivalence
3. Newton's Third Law of Motion

Laboratory:

Acceleration due to gravity

Week 5
Unit I

Mechanics of Solids

Objectives:

1. The student will be able to calculate the work done by a force applied through a displacement.
2. The student will be able to apply conservation of work-energy to problems previously soluble by dynamic considerations.

Content:

E. Work and Energy

1. $W = \vec{F}\cdot\vec{s}$
2. Energy classes
    a. Gracitational potential
    b. Kinetic
    c. Chemical
    d. Heat
    e. Electrical
3. Energy conversion
4. Conservation of energy

Laboratory:

Work-energy

Week 6
Unit I

Mechanics of Solids

Objectives:

1. The student will be able to calculate coefficients of friction between surfaces given the forces involved.
2. The student will be able to calculate frictional forces between surfaces.
3. The student will be able to determine the actual mechanical advantage and efficiency of machines.

Content:

F. Friction

1. Static
2. Kinetic
3. Rolling
4. Effects of friction or machines
    a. Actual mechanical advantage
    b. Efficiency

Laboratory:

Coefficient of friction

Week 7
Unit I

Mechanics of Solids

Objectives:

1. The student will be able to calculate impulse and momentum.
2. The student will be able to use conservation of mementum along with energy principles to describe collisions in two dimensions.

Content:

G. Momentum

1. Impulse = $\int \vec{F} dt$
2. Momentum = $m\vec{v}$
3. $\int \vec{F} dt = \Delta m\vec{v}$
4. Conservation of momentum

Laboratory:

Collisions-ballistic pendulum

Week 8
Unit I

Mechanics of Solids

Objectives:

1. The student will be able to determine rotational kinematic quantities by analogy with the linear kinematic relations.
2. The student will be able to find the center of mass of simple geometric shapes.
3. The student will be able to calculate the moment of inertia of simple physical shapes about the principle axes.

Content:

H. Rotational motion

1. Rotational analogs to linear kinematic quantities
2. Rotational kinematics
3. Center of mass
4. Moment of inertia

Laboratory:

Center of mass and moment of inertia

Week 9
Unit I

Mechanics of Solids

Objectivs:

1. The student will be able to calculate the torque produced about an axis by an applied force.
2. The student will be able to determine the combined rotational and translational motion of an object from a knowledge of the forces involved.
3. The student will be able to calculate the centripetal force required to keep an object in a given circular orbit.

Content:

5. Torque
6. Rotational dynamics
7. Angular momentum

I. Circular motion

1. Centripetal force
2. Orbital mechanics
    a. Universal law of gravitation
    b. Elliptical orbits

Laboratory:

Centripetal force

Week 10
Unit II

Fluid Mechanics

Objectives:

1. The student will be able to determine the pressure of any depth in a liquid, given the mass density and atmospheric pressure.
2. The student will be able to state and apply Archimede's Principle.
3. The student will be able to state and apply Pascal's Law.

Content:

A. Statics

1. Mass density
2. Pressure
3. Archimede's Principle
4. Pascal's Law-hydraulic press

Laboratory:

Archimede's Principle

Fluid Mechanics

Objectives:

1. The student will be able to describe surface tension and capillary action.
2. The student will be able to calculate flow rates.
3. The student will be able to apply Bernoulli's equation to fluid systems.

Content:

5. Surface tension
6. Capillary action

B. Dynamics

1. Rate of flow
2. Bernouli's equation-conservation of energy
    a. Liquids

Laboratory:

Venturi Tube

Week 12
Unit II

Fluid Mechanics

Objectives:

1. The student will be able to describe turbulent flow.
2. The student will be able to discuss the significance of the Reynold's number.
3. The student will be able to give examples of Bernouli's equation at work in gases.

Content:

b. Gases
3. Turbulent flow
4. Viscosity
5. Superfluidity

Laboratory:

Viscosity

Week 13
Unit III

Kinetic Theory

Objectives:

1. The student will be able to describe the pressure of a gas in terms of molecular energy transfer.

2. The student will be able to state the connection between average molecular energy and temperature in an ideal gas.

Content:

A. Maxwell-Boltzman statistics

B. Macroscopic effects

   1. Pressure
   2. Temperature

Laboratory:

Charles Law

Heat and Thermodynamics

Objectives:

1. The student will be able to describe the operation of several temperature measuring devices.
2. The student will be able to discuss the advantages and disadvantages of the various temperature measuring devices.
3. The student will be able to determine specific heats of substances from a calorimetry experiment.

Content:

A. Temperature
    1. Kinetic explanation
    2. Measurement

B. Heat energy
    1. Calorimetry
    2. Mechanical equivalent
    3. Electrical equivalent

Laboratory:

Calorimetry

Heat and Thermodynamics

Objectives:

1. The student will be able to determine the macroscopic physical changes which occur as materials are heated.

Content:

C. Effects of heat

   1. Expansion of solids, liquids and gases
   2. Changes of state - latent heats
   3. Superconductivity

Laboratory:

Linear expansion

Week 16
Unit IV

Heat and Thermodynamics

Objectives:

1. The student will be able to state the four laws of thermodynamics, and give resulting implications.
2. The student will be able to explain the Carnot cycle.
3. The student will be able to determine thermal efficiency.

Content:

D. Thermodynamics

1. Statistical description of status
2. Thermodynamic Laws
3. Thermodynamic processes

E. Heat engines

1. Carnot cycle
2. Efficiency
3. Refrigeration

Laboratory:

Comparison of Several Heat Engines

Week 17 Basic Electricity

Unit V

Objectives:

1. The student will be able to determine the forces between charged point objects.
2. The student will be able to calculate the electrostatic potential difference between two points.
3. The student will be able to determine the capacitance of simple geometrics.

Content:

A. Electrostatics
   1. Coulomb's Law
   2. Potential difference
   3. Capacitance

Laboratory:

Plotting equipotentials

Week 18

Basic Electricity

Unit V

Objectives:

1. The student will be able to define current and voltage.
2. The student will be able to apply Ohm's law.

Content:

B. Direct current

1. Defining current and voltage
2. Sources of DC emf
3. Measurement devices
4. Ohm's Law

Laboratory:

Ohm's Law

Week 19 Basic Electricity

Unit V

Objectives:

1. The student will be able to determine the equivalent resistance of simple series-parallel resistive networks.
2. The student will be able to apply Kirchoff's Laws to simple DC networks.

Content:

5. Kirchoff's Laws
6. Series and parallel circuits

Laboratory:

Equivalent resistance

Week 20 Basic Electricity

Unit V

Objectives:

1. The student will be able to describe quantitatively the interactions between magnetic fields and charged particles.
2. The student will be able to calculate induced voltages.

Content:

C. Magnetism

1. Magnetic field
    a. Properties
    b. Production
    c. Interaction with moving charged particles
2. Induced cmf
3. Inductance

Laboratory:

Induced cmf

Week 21 Basic Electricity

Unit V

Objectives:

1. The student will be able to describe the generation of AC voltage.
2. The student will be able to calculate peak, effective and average values.

Content:

D. Alternating current

  1. AC generation
  2. Terms
     a. Peak
     b. Effective
     c. Average
  3. Measurement devices

Laboratory :

Effective values

Week 22

Basic Electricity

Unit V

Objectives:

1. The student will be able to calculate the reactance of circuit elements.
2. The student will be able to determine the impedance of a simple circuit.
3. The student will be able to discuss the significance of the phase angle.

Content:

4. Reactance
5. Impedance
6. Phase angle
7. Motors

Laboratory:

Impedance

Week 23

Wave Phenomena

Unit VI

Objectives:

1. The student will be able to describe simple harmonic motion.
2. The student will be able to explain vaves in continous media, differentiating between transverse and longitudinal types.
3. The student will be able to explain the principle of superposition.

Content:

A. Wave Theory

1. Simple Harmonic Motion
   a. Simple pendulum
   b. Spring-mass system
   c. Circular motion projection
2. Continuous media
   a. Transverse waves - vibrating string
   b. Longitudinal waves - pressure waves in air
3. Superposition
4. Starding waves

Laboratory:

Simple harmonic motion

Week 24

Wave Phenomena

Unit VI

Objectives:

1. The student will be able to draw ray diagrams to determine image distance and size for plane, spherical and parabolic mirrors.
2. The student will be able to apply the mirror equation.

Content:

B. Light
  1. Geometrical optics
    a. Ray diagrams
    b. Reflection
      1) Plane mirror
      2) Spherical mirror
      3) Parabolic mirror

Laboratory:

Reflection

Week 25

Wave Phenomena

Unit VI

Objectives:

1. The student will be able to apply Snell's laws to refraction across plane boundaries.
2. The student will be able to draw ray diagrams to determine image distance and size in this lens systems.
3. The student will be able to apply the lens-makers formula.

Content:

c. Refraction
  1) Prisms
  2) Thin lens

Laboratory:

Refraction

Week 26

Wave Phenomena

Unit VI

Objectives:

1. The student will be able to draw ray diagrams through simple optical systems.
2. The student will be able to calculate the magnification and power of microscopes and telescopes respectively.
3. The student will be able to explain the significance of the f-number of an optical system.

Content:

2. Optical instruments
    a. Microscope
    b. Telescope
    c. Eye glasses
    d. Camera

Laboratory:

Telescope

Week 27 Wave Phenomena

Unit VI

Objectives:

1. The student will be able to explain interferance, diffraction, dispersion and polarization.

2. The student will be able to determine the intensity of a source by a photometry experiment.

3. The student will be able to calculate the illumination produced by a source of known intensity.

Content:

3. Physical optics
    - a. Interferance
    - b. Diffraction
    - c. Dispersion
    - d. Polarization
    - e. Intensity
    - f. Illumination

Laboratory:

Photometer

Week 28

Wave Phenomena

Unit VI

Objectives:

1. The student will be able to explain what is meant by the "sound barrier."
2. The student will be able to explain the doppler effect.
3. The student will be able to explain and calculate beat frequency.

Content:

C. Sound
    1. Speed of sound
        a. Variation with temperature
        b. The sound barrier
    2. Doppler effect
    3. Beat frequency

Laboratory:

Speed of sound

Week 29

Wave Phenomena

Unit VI

Objectives:

1. The student will be able to express sound intensity in decibels.
2. The student will be able to discuss the factors affecting the perception of pitch and sound level.

Content:

4. Sound intensity
    a. Decibel scale
    b. Hearing curve
    c. Noise pollution
5. Acoustic materials

Laboratory :

Sound intensity monitoring

Week 30

Wave Phenomena

Unit VI

Objectives:

1. The student will be able to discuss the mechanism for production of sound in several classes of musical instruments.
2. The student will be able to describe the musical scale and its relation to frequency.

Content:

6. Musical Instruments
   a. Strings
   b. Reeds
   c. Percussion
7. Musical Scale

Laboratory:

Analysis of Harmonic Content

Week 31

Electronics

Unit VII

Objectives:

1. The student will be able to describe crystal structure.
2. The student will be able to explain the meaning of energy bonds in semiconductors.
3. The student will be able to explaine the way semiconductor devices work.

Content:

A. Solid state physics
    1. Crystal structure
        a. Electrons and holes
        b. Duping
    2. Energy bonds

B. Devices
    1. Junction diode
    2. Junction transistor
    3. FET classes
    4. Tunnel diode
    5. Integrated Circuits

Laboratory:

Junction characteristics

Week 32

Electronics

Unit VII

Objectives:

1. The student will be able to describe the operation of simple amplifiers and oscillators.
2. The student will be able to use an oscilloscope to observe varying electrical signals.

Content:

C. Basic electronic circuits

  1. Amplifier
  2. Oscillator
  3. Ramp generators
  4. Pulse circuits

Laboratory

Amplifier characteristics

Week 33 Electronics

Unit VII

Objectives:

1. The student will be able to discuss the uses of the ECG, EEG, EMG, defibrulator and other instruments.
2. The student will be able to describe the basic operation of the above instruments.
3. The student will be able to discuss safety considerations in using the above instruments.

Content:

D. Instrumentation

   1. ECG
   2. EEG
   3. EMG
   4. Defibrualtor
   5. Pace-maker

E. Safety

Laboratory:

Analysis of an ECG

Week 34

Astronomy

Unit VIII

Objectives:

1. The student will be able to locate the north star.
2. The student will be able to locate celestial objects using star charts.
3. The student will be able to identify major northern hemisphere constellations.

Content:

A. Descriptive astronomy

   1. Celestial coordinates
   2. Celestial bodies and groups

Laboratory:

Planetarium visit

Week 35

Astronomy

Unit VIII

Objectives:

1. The student will be able to describe the use of the telescope, radio telescope and spectrophotometer.
2. The student will be able to discuss the differences in information obtained by the various instruments.

Content:

B. Research instruments

   1. Optical telescope
   2. Radio telescope
   3. Spectrograph
   4. Spectrophotometer

Laboratory:

Spectrograph

Week 36 Astronomy

Unit VIII

Objectives:

1. The student will be able to describe the various types of stars and star-like celestial objects.

Content:

C. Celestial objects

1. The sun
    a. Energy production
    b. Solar spectrum
    c. Solar storms and flares
2. Stars
3. Quasars
4. Black holes
5. Interstellar gas

Laboratory:

Observation of Solar Phenomena

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WHO Regional Office for the American
Pan American Sanitary Bureau
525 23rd Street, N.W.
Washington, DC 20037

Suggested Textbooks and Lab. Manuals

1st Year Life Science

Lab Manuals

Carlock, John R. *In the Laboratory* - *The Nature of Life*. New York Harper and Row, Publisher.

Creem, E.R. and K. Bobronisky. *Lab. Investigation in Biology*. Morristown, New Jersey: Silver Burdett Co., 1968.

Humphrey, D.C. *Life in the Laboratory*. New York: Harcourt, Brace & World, Inc., 1969.

Wharton, G.W. and A. P. Brockway, ed. *Lab Manual for Principle of Biology*. Columbus, Ohio: The Ohio State University Press.

Textbooks

Beaner, W.C. and G.B. Noland. *General Biology*. St. Louis: The C.V. Mosby Co., 1966.

Biological Science (BSCS) - Molecules to Man, 3rd Edition Blue Version. Boston: Houghton Mifflin Co., 1973.

Brooks, Stewart M. *Integrated Basic Science*. St. Louis: The C.V. Mosby Co., 1970.

Bush, Guy L. *Life Science*. New York: The Macmillan Co., 1972.

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Devlin, R.M. *Plant Physiology*. New York: Van Nostrand Reinhold Co., 1966.

Frazier, W.C. *Food Microbiology*. New York: McGraw-Hill Book Co., 1958.

Loewy, A.G. *Cell Structure and Function*. New York: Holt Rinehart and Winston. Inc., 1963.

Pelczar, M.J., Jr. *Microbiology*. New York: McGraw-Hill, 1965.

Simpson, G.G. *Life*. New York: Harcourt Brace and World Inc., 1969.

Suggested Textbooks and Lab Manuals

2nd Year Life Science

Lab Manuals

Allen, B.L. Basic Anatomy - A Laboratory Manual. San Fransisco: W.H. Freeman & Co., 1970.

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Morrison, Cornett, Tether, and Gratz. Experiments in Physiology. New York; Holt, Rinehart & Winston, Inc., 1967.

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Walker, W.F. Vertebrate Dissection. Philadelphia: W.B. Sounders Co., 1964.

Wood, G.C. ed. Biology Experiments for High School Students. New York: American Cancer Society, Inc., 1964.

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Gryton, Arthur C. Basic Human Physiology. Philadelphia: W.B. Saunders Co., 1971.

Kimber, Diana c., Gray, and Stackpale. Anatomy and Physiology. - New York: the Macmillan Co., 1966.

Parker, Anthony and Catherine, and Norma Jene Kolthoff. Textbook of Anatomy and Physiology. St. Louis: C.V. Mosby Co., 1971.

Schmidt, Kurt, and Nielsen. Animal Physiology. Englewood Cliffs, New Jersey: Foundation of Modern Biology Series, Prentice-Hall Inc., 1970.

Physical Science Bibliography

1st Year

Chemistry Textbooks

Jensen, J.T. and W.P. Ferren. *College General Chemistry*. Columbus: Charles E. Merrill, 1971.

Lee, G.L. and H.O. Van Orden. *General Chemistry: Inorganic and Organic*. Philadelphia: Saunders, 1965.

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Weller, P.F. and J.H. Supple. *Chemistry: Elementary Principles*. New York: Addison-Wesley, 1971.

Chemistry - Supplementary

Scientific American, September, 1970 (for unit on the biosphere)

Scientific American, September, 1971 (for unit on energy sources)

Physical Science Bibliography

2nd Year

Physics Textbooks

Beiser, A. *Concepts of Modern Physics*, 2nd Edition. New York: McGraw-Hill, 1973.

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Baker, D.J. *American Journal of Physics*, 34, 83 (1966). (Resource letter on physics and biology.)

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